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Fissures in Rails Laid to Mill Practice

Delayed Crystalline Transformation Near Center of Rail Head; Fracture of This Metal in Gagging and Growth of Fissures in Service

AN explanation of the causes of steel rail failures through the growth of transverse fissures has been offered by Dr. P. H. Dudley, consulting engineer for the New York Central Lines on rails, tires and structural steel. The remedies he has also suggested, and the solution, in his opinion, lies altogether with the rail mills. Briefly, his conclusions are that mill practice occasionally results in a delayed crystalline transformation of the metal near the center of the head, that then this heterogeneous metal is checked by the gagging press in the straightening process, and finally the nucleus of a fracture thus produced develops in service until rupture of the rail occurs.

An important part of his contribution to the transverse fissure problem is his finding that the fissures are of two types: that corresponding to the rail which had a convex curvature of the base, and that corresponding to the rail, the head of which was convex before the gagging. In the case of the former a checking of metal occurs in the head in gagging, while in the case of the latter a longitudinal fissure is developed as well as the more or less vertical transverse fissure, with which fissure it coalesces. The results of Dr. Dudley's investigations were submitted recently to A. H. Smith, president New York Central Lines, and the report is given below.

The emphasis placed on the absence of failures in rails rolled from reheated blooms—this as a means for securing a homogeneous crystalline structure—and a suggestion that the supports of the gagging press should be given a greater span—thus to reduce the gagging pressure—are taken to indicate Dr. Dudley's opinion of the necessary conditions in mill practice.

"My investigations show that interior transverse fissures in rail heads are induced by a combination of two or more exceptional conditions of manufacture in an occasional rail head by direct rolling, which can and should be avoided," begins the report.

"Induced interior transverse fissures in basic open-hearth rails are due in part to an occasional hot rail being cooled so rapidly by the rolls or so chilled by

Fig. 1—Intergranular type of interior transverse fissures. The nucleus is over ⅝ in. in diameter, though smaller in a majority of the specimens. Rail rolled Nov. 8, 1910; failed March 5, 1915

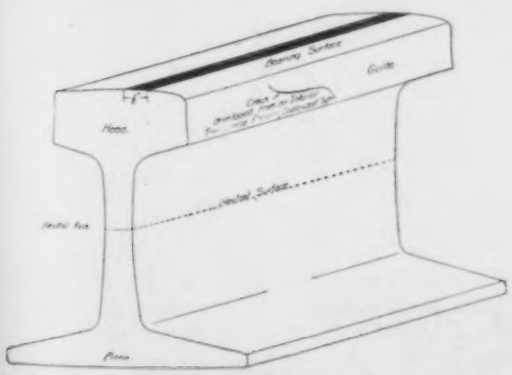


Fig. 2—6-in., 100-lb. section, showing crack common to the type of fissure due to the upsetting of the metal by the gag to shorten the head and lengthen the base. (See Figs. 5 and 10.) The bearing surface of the head shows deformation, and on several railroads it has been found that an entire train may pass over the head without the mark of contact for all of the wheels exceeding ½ in. in width. (See Fig. 6.)

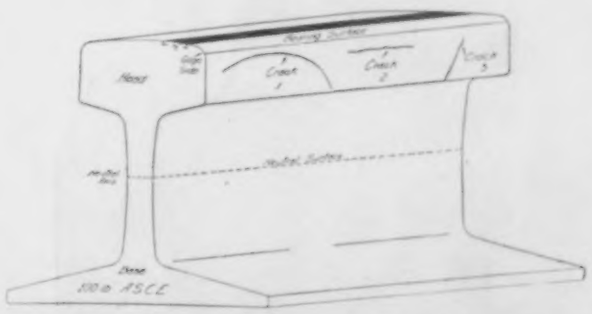


Fig. 3—100-lb. A. S. C. E. section. Crack No. 1 shows a form found in a few rails. Crack No. 2 is general for the coalescent type of fissure, and may be from 2 in. to 3 ft. long. Crack No. 3, showing that the nearly vertical interior transverse fissure has worked out to the surface, has been found in several rail heads. The coalescent type of fissure when uncapped shows what Dr. Dudley calls the imprint of the gag in all cases as indicated in Figs. 5, 8 and 10. A crack similar to No. 3 is sometimes found on the gage side of the head in the intergranular type

gusts of air before recalescence on the hot beds, as to cause a lag of some of the transformations of the metal in the interior of the head. Induced interior transverse fissures can only develop in the track from the effects of preceding causes, either of which is no longer a mystery, and their progressive stages of development occur in the following order." The rest of the report follows:

Conditions of Manufacture:

First Contributory Cause: Delayed transformations of the metal near the center of the head, and chemical or mechanical defects.

First Effect: Induced loss of strength; initial strains; physically a non-ductile core of heterogeneous metal near the center of the head.

Second Contributory Cause: Mechanical injury to the heterogeneous metal, the nucleus checked by the gag. (See Figs. 2 and 3.)

Second Effect: The produced defect of an interior invisible portion of fractured metal near the center of the head before the rail leaves the steel plant.

Conditions of Service:

Third Contributory Cause: The conditions of ordinary service for the interior fractured metal become abnormal.

Third Effect: The checked interior metal in either type is no longer able to restrict the strains of the wheel loads within the usual range of the elastic limits of the steel, as in the case of sound metal, but there develop by "detail" growth, from and around the checks, the specular surfaces of the induced interior transverse fissures until the section ruptures.

When the induced interior transverse fissures by growth crack through the metal to the air, the specular surfaces discolor and darken, as found in ruptured rails by the trackmen. (See Figs. 2 and 3.)

Fig. 4—Full size 100-lb. A. S. C. E. rail, rolled Feb. 23, 1911, failed Jan. 3, 1916. The crack was uncapped for investigation by removing the piece as exhibited in Fig. 5

Fig. 5—Full size photograph of rail and the cap, to show the effect of the gag and the "detail" growth from the checked nucleus caused by the wheel loads. The cap shows the effects of the compressive and shearing strains produced by the gag to shorten the metal of the head

Fig. 6—Full size of the bearing surface of the head in Figs. 4 and 5. Rain had partially rusted the bearing surface of the head before the train had passed over the rail, and the several wheel contacts only made the bright band about ⅛ in. in width. The crack on the gage side of the head, similar to that in Fig. 2, was found by the trackmen and the rail removed before it broke

Interior transverse fissures have not occurred in the countless thousands of rail heads of physically homogeneous metal for the reason that they do not contain the conditions of the first contributory cause, consequently, while the metal is lengthened or shortened by the second contributory cause, it is not checked.

Basic open-hearth rails of the composition of the New York Central Lines specifications and rolled from reheated blooms have not, to date, developed interior transverse fissures.

INTERGRANULAR TYPE OF TRANSVERSE FISSURES

The specimens in my collection, after investigation, I classified by June 9, 1915, into two general types: intergranular and coalescent.

Intergranular: The nucleus, in effect physically a non-ductile core in the head, which is checked between the grains of the metal by the gag of the straightening press, and may be ⅝ in. in diameter, or as small as ⅛ in. The subsequent development in the track of this type of interior transverse fissure from the checked nucleus is through the grains, a "detail" growth of specular surfaces, in striking contrast to the check between the grains, the effect of the blow of the gag. This type develops in rails or a part of a rail which was cooled "low" on the hot beds, and was then gagged upon the base to shorten its metal and lengthen that of the head. (See Fig. 1.)

Fig. 7—Full size, 80-lb. A. S. C. E. rail, rolled January, 1905, failed September, 1913. The induced interior transverse fissure did not develop until 8½ years after being rolled. The so-called imprint of the gag is deep and inclined at an angle of about 45 deg., and has been found in several induced interior transverse fissures of the coalescent type

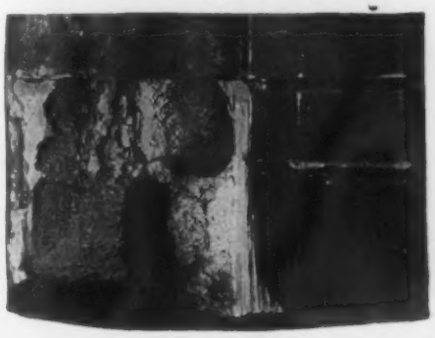


Fig. 8—Full size of the head of rail in Fig. 7, uncapped to show the imprint of the gag on the inclined black spot, nearly in the center and lower half of the head

Three characteristic fractures of the metal appear in the final rupture of the section in the induced interior transverse fissure of the intergranular type.

(1) The nucleus checked between the grains of the metal by the gag.

(2) The "detail" growth through the grains of the specular surfaces.

(3) The final fracture of rupture.

THE COALESCENT TYPE

Coalescent: A checked longitudinal elliptical nucleus, the imprint of the gag on the non-ductile metal, ½ to ⅝ in. under the bearing surface of the head which enlarges to a longitudinal fissure by the passing wheel loads. This fissure coalesces through a transverse or oblique crack at the side of the maximum shearing stresses produced by the gag, and usually develops after two or more years of service in the track into the nearly vertical interior transverse fissure. The fracture is often conchoidal at the junction of the coalescence. The longitudinal fissure, and sometimes the vertical, open on the gage side of the head, and can be discovered by careful inspection before rupture of the rail occurs in the track. (See Figs. 2 and 3.) This type develops in rails or a part of a rail which cooled "high" on the hot beds, and was then gagged upon the head to shorten its metal and lengthen that of the base below the neutral surface of the section. (See Figs. 2 to 10, inclusive.)

The nucleus checked between the grains of the metal of the longitudinal fissure by the gag is not visible to the trackmen, but it coalesces through a transverse or oblique crack to produce the nearly vertical interior transverse fissure which ruptures the rail. The nucleus checked between the grains will be disclosed only by uncapping the head of the rail.

The illustrations do not show all the probable forms of fractures of the coalescent type which may develop in the track in the different brands of rails. The core of non-ductile metal, which becomes the checked nucleus by being gagged upon the head of the rail is practically similar to the core of non-ductile metal in the intergranular type which is checked by being gagged upon the base. The fractures of the two different types appear so dissimilar that their correlations are not easily traced or comprehended without extensive study and research, though the illustrations shown are ample for classification.

Supervisors should instruct trackmen to distinguish the induced interior transverse fissures in the rail heads herein described, from the now rare surface crack which sometimes occurs where the drivers have slipped on the head of the rail and hardened the metal, and then by "detail" growth develops down through the head and web to the base until the section ruptures. Two or more surface cracks may occur in the same rail length at stations and waterplugs. It is now usual to remove rails from the main line tracks where the drivers have slipped on the heads of the rails to a noticeable extent. Such practice is to be commended.

Figs. 2 and 3, one-fourth size, indicate some forms of the cracks of the coalescent type which break through the metal on the gage side of the heads of rails.

The rails in the track should be examined daily for cracks which break through to the outside of

Fig. 9—One-half size, 5⅛-in., 80-lb. rail, rolled Jan. 12, 1912, failed Jan. 16, 1915. The final fracture of rupture extended through the web into the base before the latter failed

Fig. 10—One-half size of the head of rail of Fig. 9, uncapped to show imprint of the gag

Fig. 11—Full size photograph showing the end of the shank of a pneumatic tamping bar which had broken from an exterior "detail" crack and welded with a "V" weld which developed in service the interior transverse fissure shown from the imperfect welded portions. The unwelded surface in this case is regarded similar in effect to the longitudinal crack with its serrations of the coalescent type of induced interior transverse fissures found in rail heads

the metal, and when any are found the rail should be removed. These cracks are not all alike in the various brands of rails, owing to the different methods of gagging.

To straighten the present stiff rails, the pressure of the gag is too severe on the metal for supports of only 42-in. spans, which I had increased from 30 in. in 1891. Since then no change has been made. Recent experiments show that with wider spans the rails can be straightened with less pressure of the gag and with consequent less injury to the metal, resulting in an improved line and smoother surface. The half moon breaks in the bases of rails are generally due to the locked-up strains produced by the gag.

The causes which induce interior transverse fissures in an occasional rail head, and the effects, are stated above in their order of combination and the three different places and periods of occurrence. These facts can be utilized to prevent the conditions arising in the manufacture of rails which tend to induce interior transverse fissures in the output.

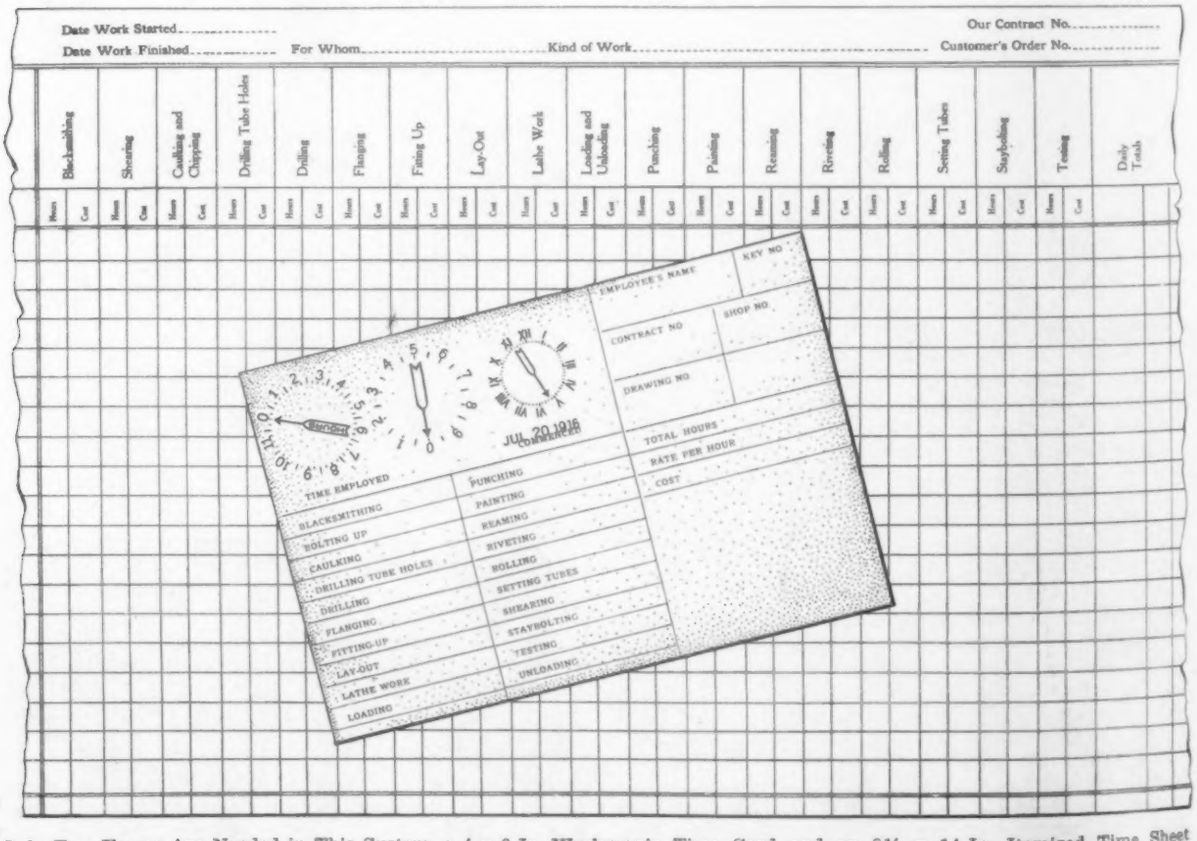
Labor Cost Keeping in a Boiler Shop

The D. Connelly Boiler Company, Cleveland, Uses Only Two Forms and the Work Is Done by a Timekeeper

A VERY simple and accurate method of keeping the labor cost in a boiler shop has been developed by the D. Connelly Boiler Company, Cleveland. While the system was devised for use in this particular plant, it could doubtless be successfully applied to other industries. The system requires very little clerical work and the entire record is kept on two forms, a workman's time card and an itemized time sheet. It requires the employment of only one man, a timekeeper, who keeps the entire record and devotes his whole time to this work.

Each order as it comes into the shop is given a shop number and every workman reports to the timekeeper before he starts on a job that has been given him by the forman. The timekeeper enters the man's name and key number on the time card and stamps it with the date and time the man starts the work. On the card is printed a list of every operation in the shop and a check mark is made opposite the proper word to indicate the operation. This card is kept in the timekeeper's desk.

When the workman finishes an operation he returns the card to the timekeeper's office and it is again stamped with the time actually required. Space is provided on the card for entries of the total hours employed, decimals being used for parts of hours, the rate or man's wages per hour and the total cost. At the time a workman turns in his card after finishing a job he is given a new card properly filled out and stamped with the time of starting work on the next job. It can be seen from this that each man has a different card for each job he works on during the day. At night all cards are rung in and stamped with the time spent on the job whether the particular operation indicated on the card is completed or not. If the work is uncompleted at night a new card is made out the next morning.



Only Two Forms Are Needed in This System, a 4 x 6-In. Workman's Time Card and an 8½ x 14-In. Itemized Time Sheet Containing a Summary of the Cards

The filled-in cards are classified according to the man's key number and the total number of hours on his card, or cards, must equal the number of hours he has worked during the day. The cards are then reassorted, those having the same shop number being grouped together and those covering similar operations on the same job being bunched together. When thus grouped according to jobs with sub-groupings for similar operations, the time spent on the various operations is totaled and recorded on the time sheets. When this record has been transferred from the time cards to the time sheets the former are filed away, all for one date being kept together.

The time sheet provided for each job and filled in from the workman's time cards every day has columns for all the operations that are listed on the time cards and in these spaces are listed the hours spent on each operation and the actual labor cost for each operation during the day. The time and cost for the day are totaled each day in a space provided on the blank and the total hours and costs are carried along each day so that a glance at the card shows the amount of time and labor cost on the job at any time before the work is completed. These time sheets which are filled out by the timekeeper are sent to the manager every morning so that he can quickly see by looking over the sheets every day how much work has been done on every active job. When a job is completed the hours of work and cost of the various operations are added up and a grand total of all operations in time and labor cost is made. The time sheets are kept in a binder in the timekeeper's office until the job is completed. This binder contains a sheet for each job that is going through the shop. These sheets also have spaces for recording the order-book number, shop number, dates of starting and finishing the work, etc.

When the material comes into the shop it is sorted out for the different jobs, each order usually being a special one requiring from 12 to 50 plates. The stock for each job is piled on the floor by itself and given a number corresponding to the shop number of the order. This makes it convenient for the workman to get additional material as it is needed on the job.

A Fire-Resisting Material for Furnaces

A material for use as a mortar for pointing up brickwork, as in furnace walls, gas ovens, retorts, boilers, bridge-walls and places subjected to high temperature has been put on the market by William Clifford & Sons Company, 360 Union Avenue, Elizabeth, N. J. Besides the putty form, it is also obtainable as a paint and has been given the name Resisto. The company has exposed brickwork to temperatures approximating 3000 deg. Fahr. and the putty joint as well as the Resisto paint covering appears to have withstood the conditions without damage to the brick or the brick joint. The company has also experimented with a bolt and nut covered with about ⅜ in. of the putty and put in the blast of a blacksmith's forge. The part of the bolt not covered was fused and burned, while on removing the putty the threads of the bolt were intact and the nut could be screwed by the hand. The material has been tested by the Bureau of Standards. Heated in an electric vacuum furnace, with a temperature measured by an optical pyrometer, the lowest temperature at which the material could be seen flow, which temperature was taken as the melting point, was 1500 deg. C., or approximately 2750 deg. Fahr.

The material is marketed to protect firebrick, fire tile and steel and iron work and, it is stated, requires no drying out. The paint, it appears, vitrifies. The company has issued a little folder which explains the methods of use. For example, in the case of bricks, they can be either dipped in the material or buttered in the usual manner, as it is expressed, but it is desirable that the surfaces should be clean and free from moisture and grease or oil. The material is the invention of Arthur Dunbar of South Melbourne, Australia.

Flexible Shaft Portable Electric Tools

In spite of their small sizes, portable electric drilling and grinding machines cannot always be used in close corners and on some kinds of shopwork. To overcome this manufacturers of these tools are employing flexible shafts. The illustration shows the latest line of portable machines equipped with flexible shafts brought out by the Standard Electric Tool Company, Cincinnati. The ordinary length shaft furnished is 6 ft., but one 10 ft. long can be used when necessary.

The Application of Flexible Shafts to Portable Electric Tools Enables the Motor to be Suspended from the Ceiling or a Traveler and the Power Transmitted in Almost Any Direction

As will be noted the motors can be suspended from the ceiling by an eye bolt, but for shopwork, the machine can be mounted on a base with a convenient handle for transporting from one part of the shop to another. The motors can also be suspended from a traveler which in some cases is handier, and as a consequence a time-saving method of transporting the apparatus.

The motors furnished with this outfit operate on either alternating or direct current at an average speed of 1000 r.p.m. The flexible shaft is fitted with a drill chuck and this is interchangeable with a buffing arbor and mandrel for holding emery wheels, so that many different kinds of work outside of drilling can be performed with ease.

Hardened Steel Gears by a New Method

The production of hardened steel gears as nearly perfect in shape as is possible on gear cutting and boring machines and doing this without subjecting the otherwise finished and hardened gears to a final grinding operation, are the claims made for an invention on which a patent (U. S. 1,152,157) has been granted to Frank H. Farmer of Cleveland, Ohio, and assigned to the White Company of that city. The method consists in rough machining the gear blanks and then carbonizing them. The carbonized gears are heated up, quenched in oil and then annealed. The annealed gears are machine-finished and finally oil hardened. This treatment, it is claimed, does not warp or destroy the accurately shaped machine-finished product.

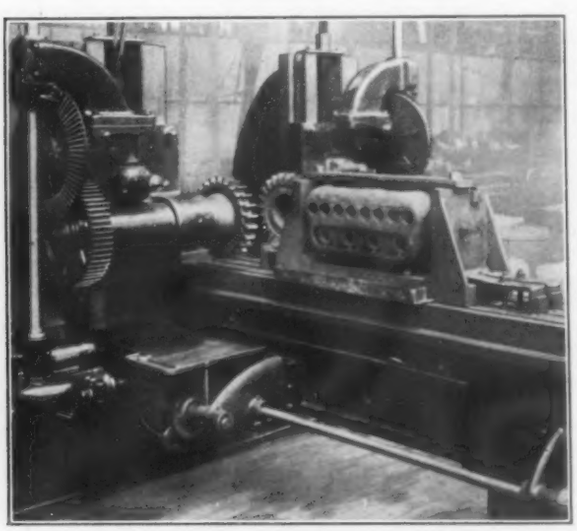
The Burt Mfg. Company, Akron, Ohio, because of greatly increased business, has found it necessary to enlarge its manufacturing facilities. It is just completing two good-sized two-story additions to its already large factory. Much new machinery will be required, orders for which have already been placed. The Burt Mfg. Company has heretofore devoted its efforts exclusively to the manufacture of oil filters, exhaust heads and ventilators, but it now proposes to embark in a general line of sheet metal work.

Making Motor Trucks in the White Plant

Some of the Production Methods Followed —The System of Shop Management, Employing and Paying and the Hospital Service

BY F. L. PRENTISS

In the plant of the White Company, Cleveland, one of the leading makers of automobile trucks, varying specifications have made every truck order practically a special one. This has necessitated a reversal of the practice of building cars first and selling them afterward to the plan of taking orders before construction. This change in conditions would make impracticable many of the production methods followed in plants having a large production of pleasure cars in a few models. In making a motor truck, however, most of the manufacturing methods are not dissimilar from those followed in building pleasure cars. The same motors are used, the transmission is similar and numerous parts that make up the chassis assembly allow the same shop methods and do not necessitate one machining department for car parts and another for truck parts.

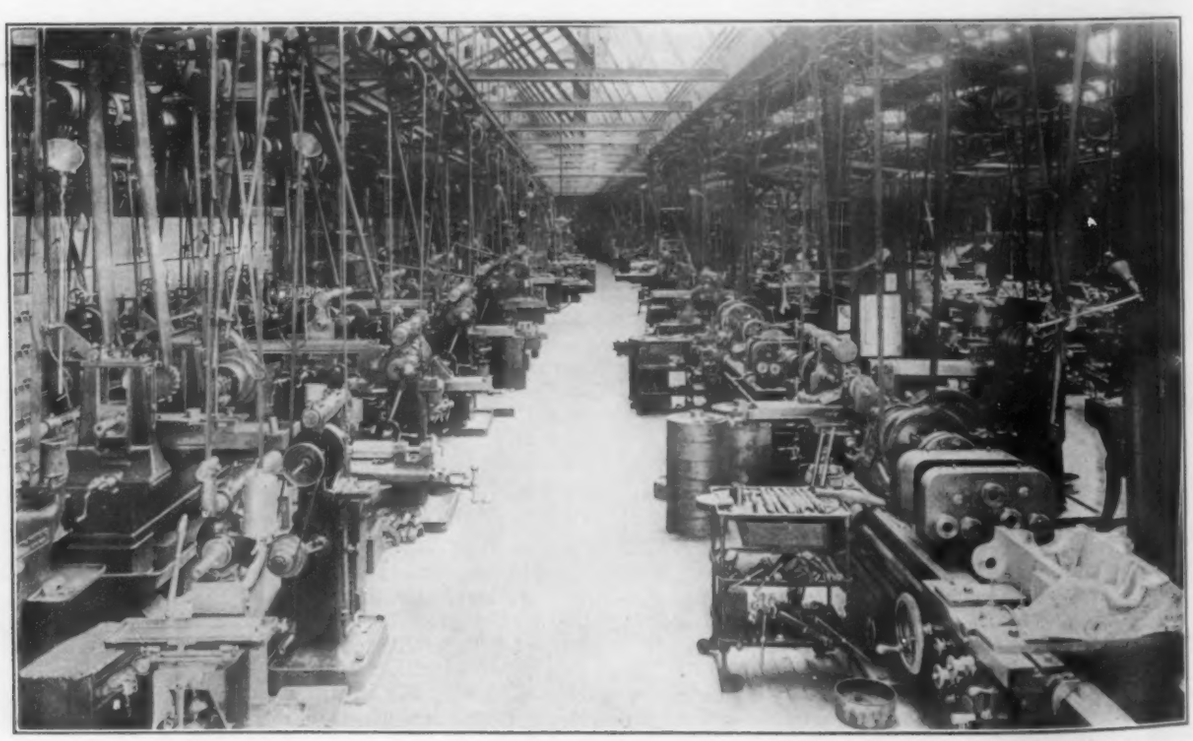


Facing Both Ends of Cylinders on Beaman & Smith Double-Head Milling Machine in One Operation

In the White plant accuracy in machine work is emphasized rather than quantity production. But recent developments in the plant have been along the line of using new fixtures for more rapid production and consequently increased output, and the improved production methods have, at this writing, made possible a daily production of about twenty 1 to 5 ton trucks over several months in addition to the regular daily output of about 10 passenger cars. The general plan is followed of doing all machine work on the various parts in their own departments rather than grouping work according to various kinds of machine operations. However, should the machines in one department be unusually busy, work is occasionally transferred to some other department where machines of a similar type are available.

The engine department, which is in charge of a general foreman, is divided into various sub-departments, each in charge of a functional or sub-foreman, who has an assistant to set up the work. These sub-departments include lathe, turret lathe, milling machine, drilling machine and crank turning operations and assembling small parts, assembling motors, cleaning motors and final inspection of motors.

The first operation on the cylinders, facing both sides, is done on a Beaman & Smith double-head milling machine, an adjustable fixture being provided in which cylinders of different sizes can be



Schumacher & Boye Lathe Equipped with a Special Fixture Having Fixed Spindles for Each of the Five Centers for Boring Crank Cases. Cutters removed

mounted. Both ends are faced simultaneously, first being given a roughing and then a finishing cut. Base holes are then drilled on a three-spindle drilling machine and two of these holes form centers for the perfect alignment of the work in all the following operations of boring, drilling, reaming and grinding.

The crankcase is bored on a Schumacher & Boye lathe with a special fixture with five fixed spindles providing for the crankshaft, and the timing gear and camshafts. The crankcases are located on the machines by base holes on the cylinder face.

The first machine operation on the connecting-rod, drilling the piston pin hole, is done on a three-spindle drilling machine. After facing, a special fixture is used in milling the lock on the crank end of the connecting-rod. This operation is performed by clamping four rods in a special fixture and milling the four simultaneously with gang milling cutters.

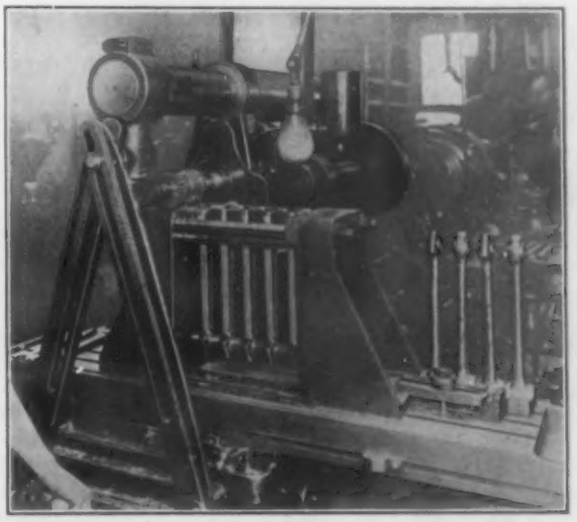
Practically all of the machine screw products used by the company are made in its own screw machine department. Besides the hand machines there are 70 automatic screw machines in sizes from $\frac{3}{8}$ in. to $6\frac{1}{4}$ in. Six tons of steel and brass wire are used in a day and the production has reached as high as 342,000 parts in a week.

Wheels for trucks are machined on Bullard vertical boring mills. The steel casting for a rear wheel for a 5-ton truck weighs 700 lb. and the wheel when finished is 35 in. in diameter and has a 12-in. face. The first operations in their order are chucking, boring, threading and turning. Then the wheel is turned over and the same operations are performed on the other side, and at the same time the face is turned, $\frac{1}{2}$ to $\frac{5}{8}$ in. of metal being removed from the face in the machine operation. The machine work on a wheel is completed in 2 hr.

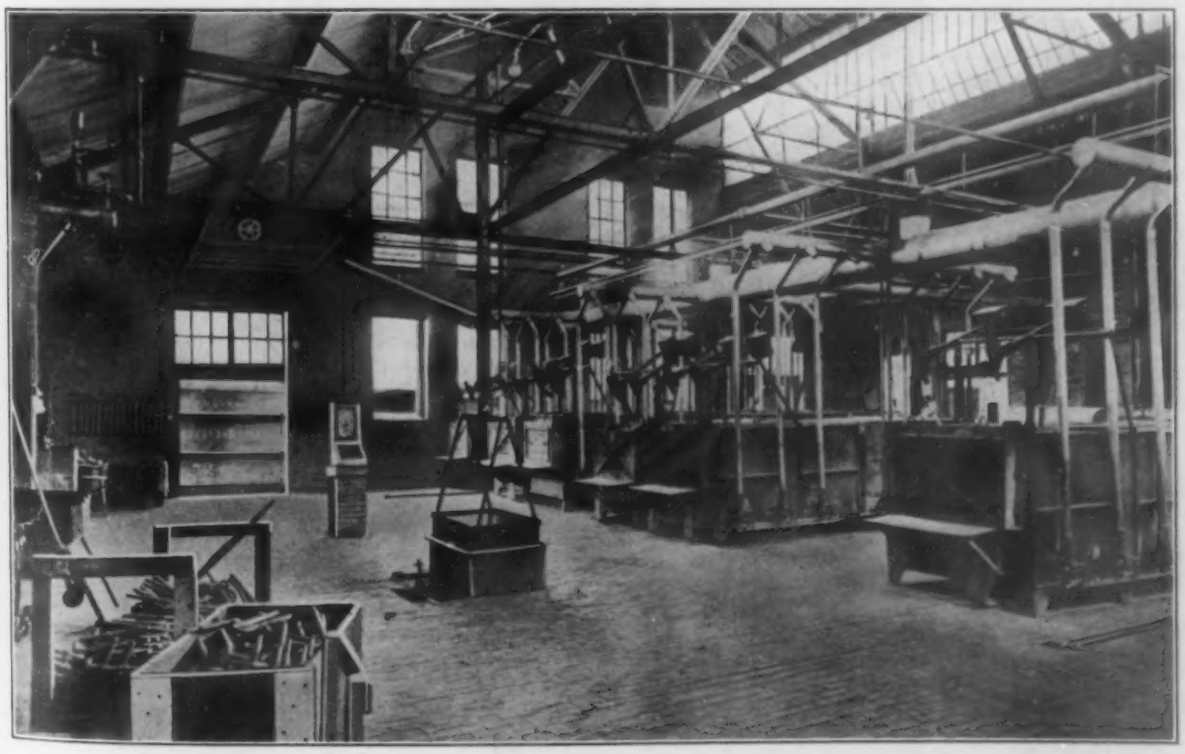
It has been the usual practice to use German tubing for ball bearing ring blanks $1\frac{3}{4}$ in. and larger, but now that this tubing is not available chrome steel bars are used for ring blanks 4 in. in diameter and under, and hand-forged chrome steel ring blanks are used for larger size rings. These blanks are forged in the steel mills to inside and outside diameter. Bearing rings are made up to 8 in. in diameter for the rear axle of 5-ton trucks

The first operation on a large bearing ring is facing one side of the forged blank. Then the inside is bored, the outer diameter is turned, and the opposite side faced. After these machine operations the rings are hardened and ground. The first grinding is on the sides, which is done on a Heald grinder, the work being held in place by a magnetic chuck. The outer diameters of the rings are then ground on standard grinding machines, first being accurately centered by placing several rings in an arbor in a 90-deg. centering device and being bolted in place and held by a collar at each end of the arbor. The final operation is grinding the ball-bearing race. This is done on a battery of seven special grinding machines built by the company and on a special type of Landis grinding machines that are equipped with ball-bearing spindles.

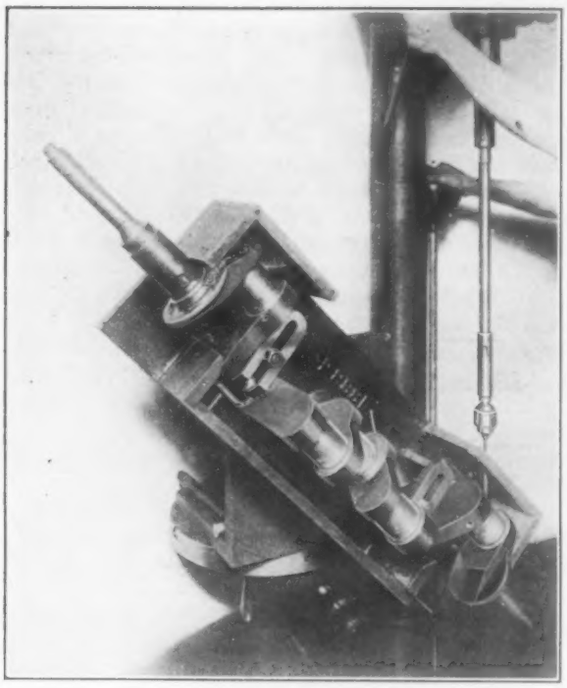
The method of cutting 38 teeth on the large roller chain sprockets is a departure from usual practice. The bulk of the stock is removed with



Milling Lock on Connecting Rods on No. 4 Cincinnati Milling Machine, 5 Rods Being Held in a Special Fixture



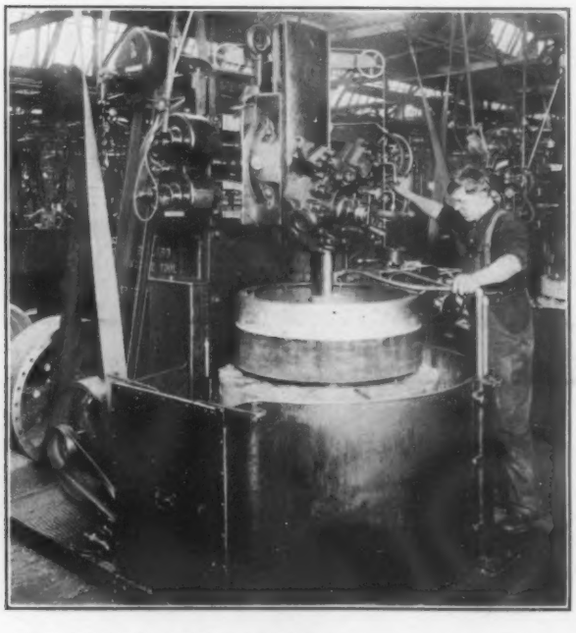
One Side of the Heat-Treating Department, Showing Bellevue Case-Hardening and Heat-Treating Furnaces with Fuel and Air Pipes



Special Universal Jig So Holes Can Be Drilled at Proper Angle from Either End. Jig swivels on a center

an eight-spindle drilling machine, the drill holes being made as close to the edge of the blank as possible. The teeth are then finished on a Hendey Lincoln type of milling machine, four blanks being located on an arbor clamped to the face plate of an indexing attachment.

Heat-treatment of parts has been extended so that now nearly every minor part down to bolts and step-irons is case-hardened or heat-treated to secure maximum strength, and where possible to reduce the size and weight of the part. Transmission gear blanks are first rough cut, then carbonized and annealed, after which they are given a final cut and then hardened. By this method of procedure there is only a low heat hardening operation after a final cutting and danger of distortion is eliminated. All forged parts that are liable to breakage are tested with a scleroscope and are kept within certain limits. After being tested with a scleroscope each part is stamped with a number, showing the hardness number. Such parts as steering knuckles and arms, lamp brackets and spring yokes are oil treated so that their strength may be maximum for the weight. For case-hardening and heat-treating, gas and oil-fired furnaces are used. The furnaces are located in the center of the heat-treating department, so that escaping heat is carried through the windows of the monitor above. Oil for quenching is cooled by passing through coils of pipe around which water from the factory water supply circulates.



Bullard Vertical Milling Machine Turning Truck Wheels

Orders from the general office are sent to the car order department in the office of the general superintendent, who is at the head of the production department and under whom are several assistant superintendents. Here the orders are dissected, and each department that has anything to do with the filling of the order is furnished with its part of the order. All the work in the car order department is attended to by its head and four assistants. The one important report or schedule that is prepared and on which the production operations are based is the material and production schedule. This is made out on a typewriter without the use of a printed blank and copies are sent to the various foremen. These schedules classify the various models and special trucks and specify the number of each model to be turned out weekly and sometimes daily for a period extending over several weeks. The totals for each model are carried along from week to week in tabulated form to the close

(Company)
TO EMPLOYMENT DEPARTMENT
THE WHITE COMPANY

Recommendation for Employment

DATE _____ NO. 2

NAME _____ AGE _____

ADDRESS _____ PHONE _____

IN TOWN _____ OUT OF TOWN _____

HOW MUCH EXPERIENCE _____

HOW LONG ACQUAINTED WITH _____

RECOMMENDED BY _____
YOUR NAME YOUR CLOCK NO.

APPROVED BY _____
YOUR FOREMAN'S SIGNATURE

NOTE:—KINDLY FILL OUT THIS FORM IN DETAIL WITH INFORMATION ABOUT SOME ONE WHOM YOU THINK IT WOULD BE DESIRABLE FOR US TO EMPLOY. RECOMMEND ONLY 1ST CLASS MEN.

Employees Recommend Men for Employment

of the last week on the schedule. Sometimes these schedules are in effect for several weeks without changes or revisions. Each department has a clerk who acts as an order clerk, and work is planned and material ordered by the foreman and his clerk, according to the requirements as shown on the production schedule.

Assembled and completed parts are taken to the erecting department according to the production schedule. The superintendent's office also furnishes the erecting department an erecting schedule showing the number of cars to be erected each day and the individual number of each car. Efforts are made to keep the erecting schedules made out five weeks in advance. Each order number becomes a car number when it reaches the erecting department and a complete record of each car by number with its specifications is kept by a card index system in the erecting department.

The different departments are kept in close touch by frequent meetings. The assistant superintendents hold a meeting every morning and separate daily meetings are held by the foremen and order clerks. To secure the more frequent co-operation of the men, to arouse their interest and give them a voice in the factory management, each department has a committee of 10 to 20 employees. Each committee meets every two weeks with its foremen and

discusses working conditions, safety matters, improvement in shop methods and various other topics of interest. Suggestion boxes are provided in each department and these suggestions are opened by the committee and discussed. Complete minutes of the proceedings at the committee meetings are made and these are typewritten and sent to the superintendent. In this way matters discussed at the committee meetings are brought to the superintendent's attention and he is kept in close touch with the men all over the plant. Copies of the committee's reports are also posted in the locker-rooms so that employees not on the committees may know what is being done by the committees in their own departments. The committees not only are a medium by which the men reach the superintendent, but a means by which the superintendent reaches the men. Whenever the superintendent has under consideration anything that pertains particularly to the men, he does not make the proposed change without first putting it up to the men through their various committees, and in this way he learns the sentiment of the employees.

The employment department is in charge of an employment manager whose duty is to secure proper men for possible openings. The actual hiring is done by the departments in which the men are to be employed. When a man is wanted the foreman

CLEVELAND OHIO ..... 19.....

THE WHITE COMPANY

GENTLEMEN:-

PLEASE NOTIFY MY FOREMAN

MR. ..... THAT I WILL BE ABSENT FROM MY WORK

FOR ..... DAYS BEGINNING ..... MY ABSENCE

DUE TO .....

.....

YOURS RESPECTFULLY,

.....

CLOCK NO .....

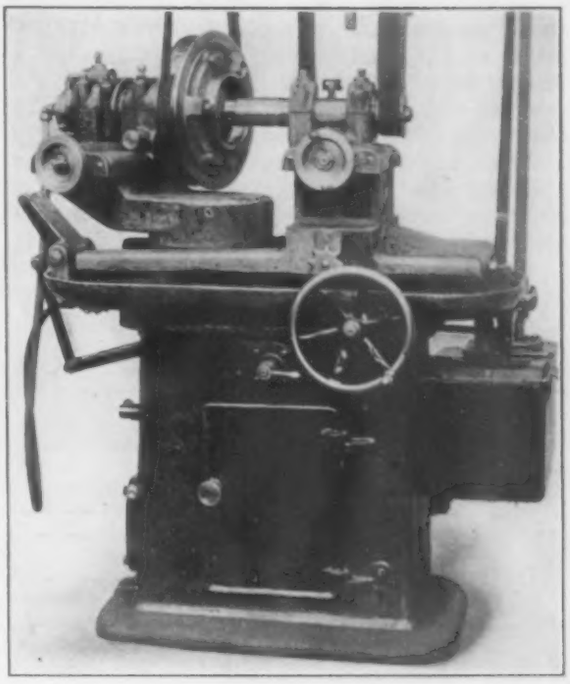
EMPLOYEES MUST SEND IN THIS CARD WHEN THEY ARE UNABLE TO REPORT FOR WORK. TELEPHONE CALLS NOT ACCEPTED

A Postal Card is Supplied for Reporting Absences

makes a requisition to the employment department for men for certain work and the requisition is approved by the assistant superintendent covering the foremen's department. The employment manager secures a man he thinks suitable for the work and turns him over to the assistant superintendent and foreman, who pass on his qualifications. In this way no workman is forced into the department by the employment department. A man seeking work sees the employment manager and if there is a possible chance of needing his services he makes a written application on a blank form provided and his application is put on file. As the requisitions reach the employment department, letters or phone messages are sent to the men having applications on file.

In addition to the application file the company has a plan of having its employees recommend men for places. A recommendation blank has been prepared, copies of which are placed in the hands of foremen of different departments who distribute them to the employees. Any employee having an acquaintance whom he thinks will make a first-class workman can fill out one of these recommendation blanks. One copy of the blank goes to the employment office and the other to the man recommended, who uses the filled out recommendation blank as a reference when calling at the employment office.

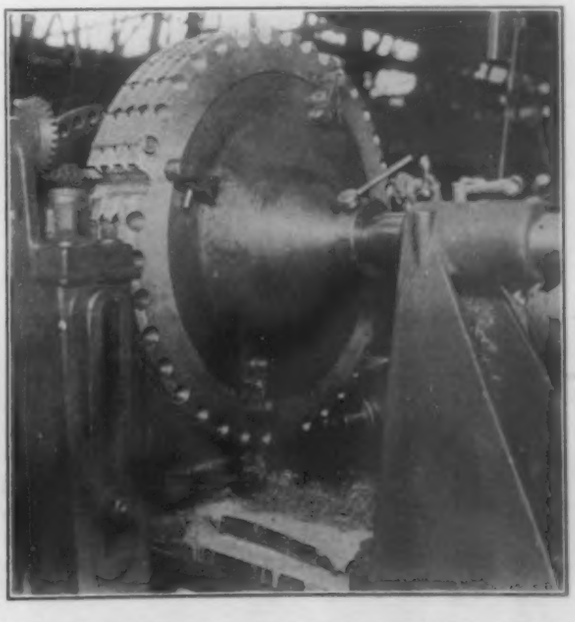
Men are paid every two weeks. Complying with an expressed wish of the men, no bills in larger



One of Seven Machines Specially Built by the White Company for Radial Grinding of Ball Races

denomination than $10 are used in paying. A day or two before pay day, the men's time cards are figured out and delivered to them for purposes of checking with their own records. The card is made out for so many hours' pay and not for the actual amount of money. When a man receives his pay, which is distributed while he is at work, he gives up his signed time card as a receipt.

A report on an employee is made out on a blank provided for that purpose when occasion requires; that is, when he is hired, discharged, quits, permanently or temporarily, or is transferred to another department or when his pay is changed. Space is provided on this card for comments on the man's qualifications. One copy of this report is kept by the foreman, one goes to the timekeeper and one is kept in the employment office, where the proper entries taken from this card are made on the employment record kept on the back of the man's application card. Employees are furnished with stamped

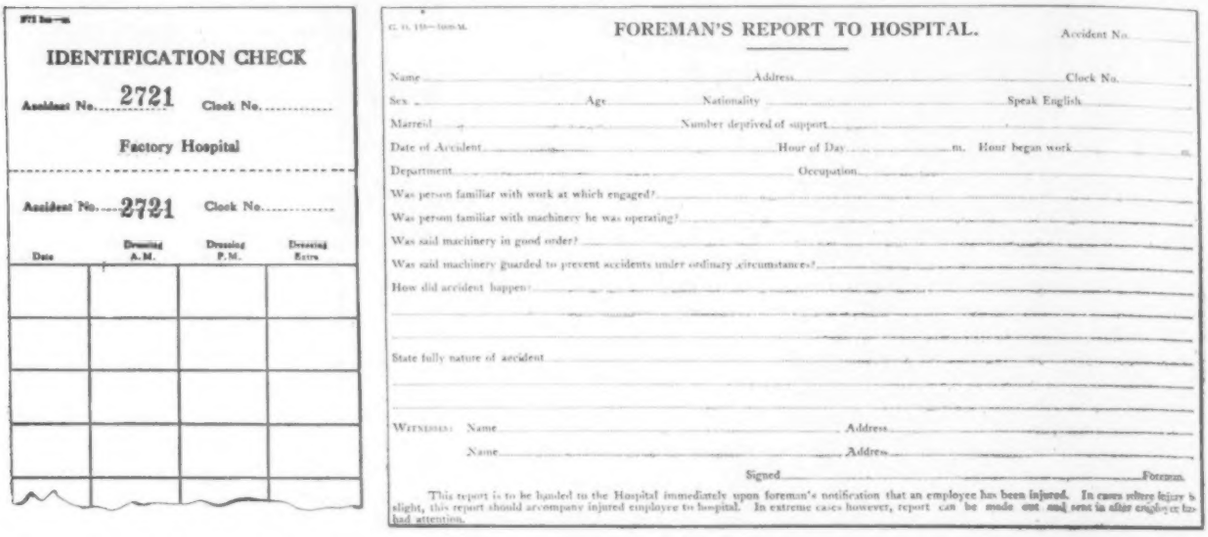


Cutting Teeth of Truck Driving Sprocket on Hendey Machine

postal card forms for reporting to the company when they are unable to report for work, giving the length of time they expect to be absent and the reasons therefor. Notification of absence by telephone is not accepted. To insure prompt delivery without the delay of passing through the regular mail channels at the general office, these cards bear a printed address of a post-office box number and are taken from the post office every morning by a messenger.

The works hospital is fully equipped with first-aid appliances and is in charge of a surgeon and three nurses. No first-aid treatment is allowed in the plant. When a man is injured he is sent to the hospital by the foreman, who makes out a report stating the nature and cause of the accident and other detailed information. Each accident is recorded and every dressing or treatment given is noted on a card that is kept in an ordinary time-card rack. Attached to this card is an identification check stub which the man presents when he calls for treatment. He must report to the hospital daily until released by the nurse in charge. These hospital cards are moved daily from one rack to another so that the nurses can tell by a glance at the rack at the end of the day if any man has failed to report. An automobile is kept in readiness at all times for emergency cases, taking the injured to a hospital or to the surgeon's office. An employee absent on account of sickness or any not reporting to the hospital is kept in close touch with by visits, made usually by his foreman.

Workmen's insurance is carried by the company under a provision of the Ohio workmen's compensation law that allows an employer to conduct its own insurance department, payments for injuries being required to be as much as those allowed by the state for similar injuries. The company finds that the men prefer to have injury claims adjusted directly by the officers of the company with whom



IDENTIFICATION CHECK

Accident No. 2721 Clock No.

Factory Hospital

Accident No. 2721 Clock No.

Date	Dressing A. M.	Dressing P. M.	Dressing Extra

FOREMAN'S REPORT TO HOSPITAL. Accident No.

Name Address Clock No.

Sex Age Nationality Speak English

Married Number deprived of support

Date of Accident Hour of Day m. Hour began work m.

Department Occupation

Was person familiar with work at which engaged?

Was person familiar with machinery he was operating?

Was said machinery in good order?

Was said machinery guarded to prevent accidents under ordinary circumstances?

How did accident happen?

State fully nature of accident

Witnesses: Name Address

Name Address

Signed Foreman.

This report is to be handed to the Hospital immediately upon foreman's notification that an employee has been injured. In cases where injury is slight, this report should accompany injured employee to hospital. In extreme cases however, report can be made out and sent in after employee has had attention.

Form of Record Cards of Works Hospital. The foreman's report has rulings on the back for the nurses', expense and other records

REPORT ON EMPLOYEE
TO EMPLOYMENT DEPARTMENT

THE WHITE COMPANY

DATE

NAME DEPARTMENT RATE CLOCK NO.

REQ. No. AGE ADDRESS

KIND OF WORK ACTION TO TAKE EFFECT AT O'CLOCK A. M. P. M. (DATE)

HIRED DISCHARGED QUIT LAY OFF NEW CLOCK No.

TRANSFER TO DEP'T IN NEW DEP'T WORKS AS CHANGE RATE FROM TO

AS A WORKMAN IS HE—POOR FAIR GOOD FIRST CLASS

REASON FOR ACTION

HAVE ALL TOOLS BEEN TURNED IN ALL PERSONAL PROPERTY REMOVED LOCKER KEY GIVEN RETURNED

WOULD YOU RE-EMPLOY IN YOUR DEPARTMENT DO YOU THINK ADVISABLE TO EMPLOY ELSEWHERE

—APPROVED BY SUPERINTENDENTS—

FOREMAN

EMPLOYMENT SUPERVISOR

PAYMASTER

F-158 5000 M

One Copy of This Report is Kept by the Foreman, One Goes to the Timekeeper and One Remains in the Employment Office

they come in contact rather than by men connected with the state industrial commission.

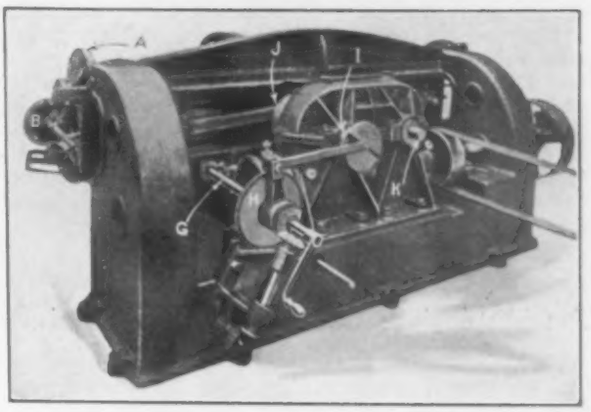
A mutual benefit society is conducted entirely by the employees and has the high executives on its membership list. This society, with an initiation fee of $1 and bi-weekly dues of 25c., pays a sick benefit of $8 per week for the first 12 weeks and $5 a week for the second 12 weeks and $3 a week for the third 12 weeks. A shop store is maintained by the employees and profits have averaged over $400 per month. Of these profits 70 per cent goes to the mutual benefit society and 30 per cent to an amusement fund.

HERRINGBONE GEAR MACHINE

An English Machine Tool Employing Reciprocating Gears as Planing Cutters

A machine capable of cutting double helical or so-called herringbone teeth as well as gears with straight teeth either in a straight line or staggered is being used by the Power Plant Company, West Drayton, Middlesex, England. It is a development of the principle underlying the Fellowes gear-shaping machine and the cutters employed are themselves gear wheels. The teeth of the blank are generated by the rolling action of the cutter upon it and it is claimed that the cutters used in this machine are accurate to a greater extent than is commercially practicable in the case of the hobs used in that type of gear generating machine.

The base of the machine consists of two rigid bed plates bolted together at right angles to each other. The two cutters which are employed, one to cut the teeth belonging to the left-hand helix and the other corresponding to the right-hand helix, together with the mechanism for reciprocating the cutters and twisting them to give the helical motion required are mounted on the longer of the two bed plates, while the blank is mounted on the other. The blank and the cutters are caused to roll together with the velocity ratio corresponding to the number of teeth on each and at each successive revolution of the blank the latter is fed toward the cutter, this process being continued until the full tooth depth is obtained. The reciprocating motion of the cutter, it is explained, eliminates the clearance between the two sets of teeth and at each cut both the cutter and the blank are turned through a small angle by a ratchet mechanism. The blank is rotated by the wormwheel *A*, which in turn derives its motion from the change gears at *B*. To facilitate the operation of the machine the driving

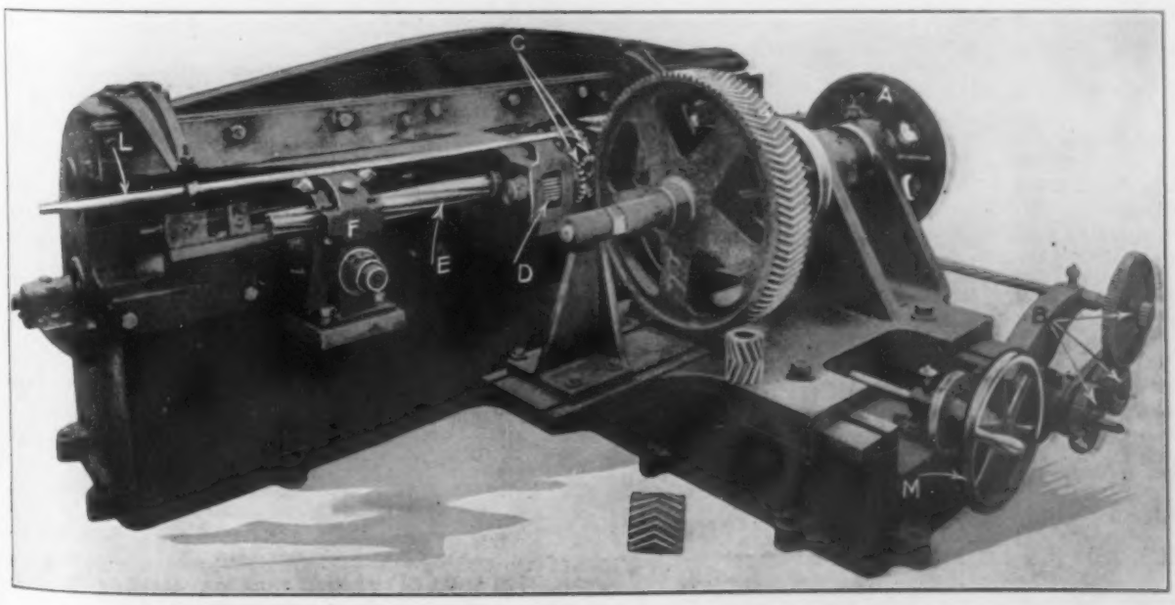


The Reciprocation of the Cutters and the Rotary Feed of the Blank Are Controlled by a Combination of Bevel Gears and a Ratchet and Pawl

wheel of the change gears has the same number of teeth as the cutter, while the number of teeth in the driven wheel corresponds to the number to be cut in the blank.

The two cutter heads *C* are mounted on shafts which are integral with the spur gear *D*. This gear meshes with another mounted on the rifle bar *E*, which passes through a rifled hole in the wormwheel *F*. When the machine is in operation this wormwheel is rotated by bevel gearing deriving its power from the blank rotating mechanism. The driving member of these bevel gears is coupled by a clutch to a shaft which connects through other bevel gearing at its opposite end with the feed shaft *G*, the adjustment of this clutch varying the relative angular position of the two cutters to each other. The feed shaft is actuated by the ratchet wheel *H*, which is driven by a link from the shaft *I*. At the other end of this shaft is a disk crank, *J*, that actuates one of the saddles through which the shaft carrying one of the cutters passes, the other saddle deriving its motion from the shaft *K*. The ratchet wheel *H* is connected to the change gears *B*, which provide for the rotation of the blank, through additional bevel gearing.

As the cutters are essentially planing tools, they require relief on the return stroke which is provided by pivoting the heads carrying them to give enough freedom of motion to supply the desired relief for the tools without interfering with the engagement of the gear *D* with its mate. Reliance is placed upon the friction rod *L* that slides in a fiber bushing, the grip of which can be adjusted by the friction bolt, to insure the cutter clearing the work on the return stroke. The resistance offered by this bushing on the return stroke is employed to swing the cutter clear of the work.



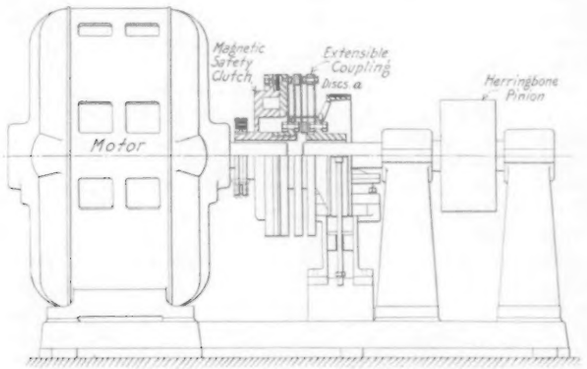
Machine for Cutting the Teeth of Herringbone Gears Ranging from ½ to 25 In. in Diameter with Reciprocating Cutters

The handwheel *M* and the screw which it actuates serve to adjust the work saddle to accommodate various sizes of blanks ranging from ½ to 25 in. in diameter and also to feed the cutters to the correct depth. If desired the interconnection of the cutters can be broken, thus providing for independent adjustment.

It is possible by a slight modification to cut straight-tooth gears, and it is explained that as both cutters operate simultaneously and have a large range of travel, it is possible to turn out a quantity of these gears at one time.

An Extensible Coupling for Mill Drives

The Cutler-Hammer Clutch Company, Milwaukee, has developed a new type of coupling for use with mill drives, particularly where herringbone gears are used. The extensibility of the coupling is independent of the amount of torque transmitted and is the same at no load as when full power is being transmitted. A certain amount of flexibility is also present in the clutch and this too is not affected by the amount of torque transmitted. The coupling was designed for use with a set of rubber calendar rolls but, it is pointed out, is capable of a number of other applications where an extensible



An Extensible Coupling for Mill Drives Designed to Permit the Pinion to Align Itself with the Gear and Remain Unaffected by the End Thrust of the Shaft

coupling is desired. In designing this coupling three factors had to be taken into consideration. The coupling must transmit the necessary power between the motor and the herringbone driving pinion and at the same time leave the latter free to align itself with the gear with which it meshes and also not transmit any end thrust caused by the lateral motion of the driving shaft to the pinion.

The construction of the coupling is simple, consisting of a number of thin disks bolted together to form the disks of the coupling. The use of thin disks was decided upon as the deflection of a thin circular plate under a given load varies inversely as the cube of the thickness. While the torque transmitted by the single disk ⅜ in. thick is the same as that transmitted by three ⅛-in. disks, the flexibility of the latter combination is nine times that of the former. In this coupling, which is 32 in. in diameter, it is stated that the correctness of this theory has been satisfactorily demonstrated, the force necessary to cause a deflection of almost 1 in. being much less than the end sliding friction in the bearings.

Imports of Graphite Much Larger

Graphite or plumbago imports are better than for some time, so that the crucible situation should be somewhat easier. The following table is from Government figures, in gross tons:

		Per Month
Jan. to June, 1916, 5 months	15,711	3,142
Year 1915	20,605	1,734
Year 1914	19,645	1,637
Year 1913	25,785	2,148

The present monthly rate is about 50 per cent larger than the 1913 rate of 2148 tons per month and nearly double the average for 1914.

Machinery and Machine Tools in Peru, Bolivia and Chile

The Bureau of Foreign and Domestic Commerce announces new information now available about the markets for machinery and machine tools in Peru, Bolivia and Chile. This information is contained in a report prepared by Special Agent J. A. Massel, author of a previous work on similar markets in Argentina. Mr. Massel is a mechanical engineer who has been traveling for the bureau in South America for the express purpose of getting together this material. He has made a careful analysis of the industries that use machinery and machine tools and has pointed out all the worth-while opportunities. The prospects for future developments are explained carefully, and lists are given of the principal users and dealers. The report contains 88 pages and may be obtained for 10c. from the Superintendent of Documents, Washington, or from the nearest district office of the Bureau of Foreign and Domestic Commerce.

Pneumatic Tools Used in Restoring Oil Tanks

The pneumatic tools built by the Chicago Pneumatic Tool Company, Chicago, played a prominent part in repairing twelve 17,000-gal. oil tanks recently. These tanks, which were 10 ft. in diameter and 30 ft. long, were damaged in a recent fire at the distributing plant of the Texas Oil Company located at Birmingham, Ala. In addition to being warped by heat, the tanks also had a number of holes in them as a result of the explosions which occurred during the fire. The rivets in the damaged portions of the tanks were removed with Boyer rivet busters, and pneumatic hammers were used to cut the plates and straighten them where they were not too badly damaged. The plates employed in repairing the tanks were riveted with Boyer riveting hammers, and Little Giant pneumatic drilling machines were used. The Johnson & Barry Steel Company, North Birmingham, Ala., had the contract for doing the work.

Making Tungsten Malleable

To render tungsten malleable and ductile is the object of an invention of Alexander Just of Budapest, Austria-Hungary, covered by a patent (U. S. 1,179,009—April 11, 1916), which he has assigned to the General Electric Company. He subjects to fusion a mass comprising metallic tungsten and not more than 2 per cent of boron or boron nitride. It is known that tungsten, when melted or solidified, is not malleable and ductile, so that it cannot be worked or drawn into wire. Boron seems to overcome this property. It is surmised that at the fusing temperature of the tungsten, tungsten boride is formed and that this, either independently or in the form of a fixed solution formed with the tungsten, prevents the formation of large crystals which make the metal especially brittle.

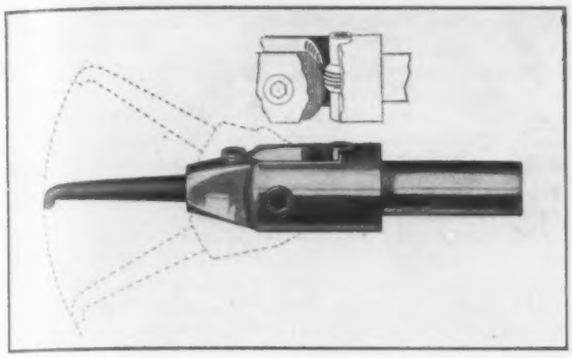
The A. O. Smith Company, Milwaukee, manufacturer of pressed steel automobile frames and other automobile parts, has taken out a group insurance policy covering the lives of its 1800 or more employees. The company is noted for its welfare work. A recent innovation is a provision for motion-picture exhibitions twice a week. Each Monday and Friday, at noon, pictures are thrown on a screen in the main shop, where the men congregate for lunch. The annual outing given by the company to its employees and their families was held at Waukesha Beach, Wis., Aug. 12, and 5000 people were entertained.

H. M. Robinson & Co., Inc., Philadelphia, has been incorporated with a capital stock of $10,000 by Celia and Harris M. Robinson, 3117 Westmont Street, and Lillian R. Dwell, 1418 South Sixth Street, to conduct a general smelting business and to deal in metals.

The Eastern Tool & Mfg. Company, manufacturer of wire shapes and builder of special machines, has moved from 74 Richmond Street, Newark, N. J., to Bloomfield Avenue and Erie Railroad, Bloomfield, N. J.

New Boring Tool with Worm Adjustment

A new boring tool simple in construction and easy to adjust to the exact size and position wanted is being placed on the market by the Clark Machinery Company, 1302 Ontario Street, Cleveland. It is adjusted by a worm and wormwheel accurately fitted and actuated



This New Boring Tool Is Adjusted as Shown by a Worm and Wormwheel Segment

by a wrench, making it unnecessary to tighten the tool after adjustment and eliminating screws to be loosened and tightened in making adjustments.

The point is held in a holder by one set screw, and should it be broken, can be replaced by a new one made from high-speed steel. It is designated as a universal boring tool for the reason that it can be provided with a left-hand point. The tool is made in five sizes and all wearing parts are hardened. It is claimed to be a particularly valuable tool for a tool maker.

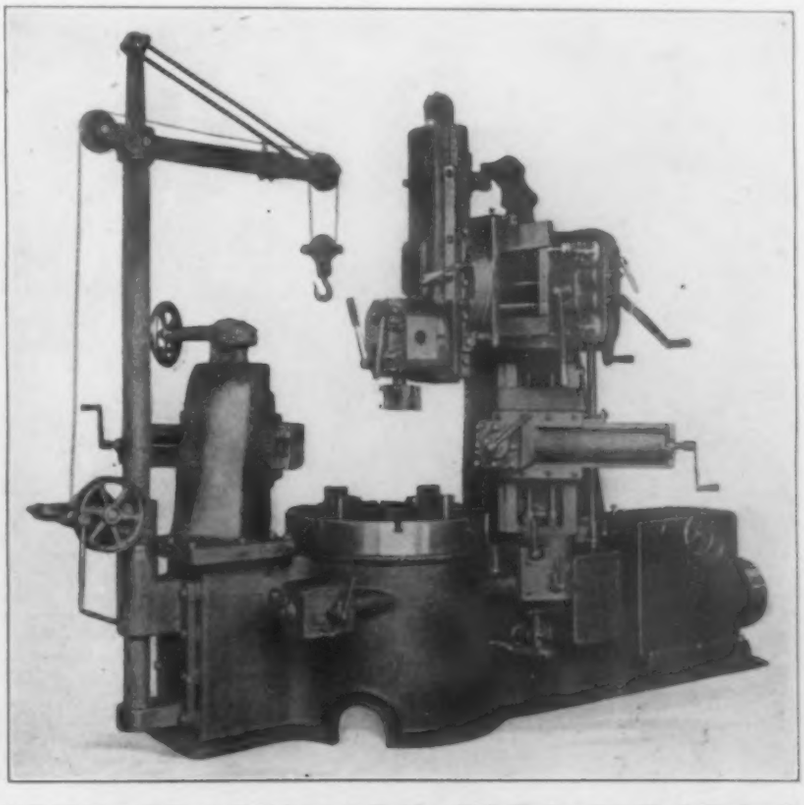
Triple-Turret Boring and Turning Mill

A high-speed, triple-turret vertical turning and boring mill has been built by G. Wilkinson & Sons, Bradford Road Tool Works, Keighley, England. The design of the machine, which was illustrated in a recent number of London *Engineering*, includes change gears for all automatic movements and a crane for placing the work on the table and removing it.

All tools can work simultaneously if desired and one, it will be seen, is carried on a turret head fitted with four tool holders. This head has a spring plunger and lever arrangement to assure alignment with its own slide. Automatic, vertical and horizontal self-acting feeds are provided. Six changes are readily available by manipulating a handle. The other tool holders are mounted on compound slide rests moving on stiff vertical box standards which are firmly bolted to the main body on either side of the table. Hand and automatic feeds are provided for these tools, which can be stopped and reversed as desired.

The table has four openings for chuck jaws and T-slots in its upper surface. A single gearbox provides the power for automatic motions of the machine, and all the gearing required for the purpose has machine-cut teeth.

Two sizes of the machine are built, one handling work up to 30 in. in diameter and a height of 21 in., while the larger is intended for work not exceeding 3 ft. in diameter and 2 ft. in height.



A Triple-Turret Vertical Boring and Turning Mill Having One Head Equipped with Four Tool Holders

Effect of Work on Aluminum

The effect of work on aluminum was discussed by F. J. Brislee before the Faraday Society (British) recently, and his results tend to confirm the amorphous theory advanced in connection with iron and steel. He shows that the specific heat of the metal varies with its structural conditions, being higher for the amorphous state than for the crystalline. The effect of prolonged annealing at as low a temperature as 100 deg. C. is to lower the specific heat and tensile strength, but to increase the flexibility in the case of wire, thus indicating the occurrence of considerable structural changes at this moderate temperature. Emphasis is placed on the fact that the crystalline structure of the metal disappears at a very early stage under cold working, while the reverse change proceeds so gradually that annealing, unless long continued, is ineffective. While annealing for 10 hours at 500 deg. C. renders the metal dead soft with maximum elongation, the structure is still largely amorphous; besides the primitive crystals thus formed are more readily changed into the amorphous state by additional cold working than the large crystals developed by longer annealing. This is regarded by the author as a feature of great interest to makers of structural members which may be exposed to sudden lateral strains, as fracture may easily result unless the metal has been annealed to a sufficient degree.

All steam boilers in Pennsylvania carrying pressure greater than 15 lb. per square inch are to be thoroughly inspected every year, under operating conditions, according to rules made recently by the Industrial Board of the Department of Labor and Industry. Boilers exempted from inspection are those subject to inspection under Federal laws, boilers on automobiles and boilers of steam fire engines brought into Pennsylvania for temporary use. Boilers carrying pressure of less than 15 lb. per square inch must be equipped with safety devices approved by the board. The code adopted recently by the board applies to boilers contracted for on or after July 1, 1916, and to boilers contracted for before that date but which are to be delivered after Jan. 1, 1917.

A BRITISH SHELL FACTORY

Machining Arrangements of One of the Semi-Public Plants—Women Employed

How Great Britain has been enlisting the services of different British manufacturing companies to design, build, equip and operate shell-making plants, on money furnished by the Government, was told in THE IRON AGE of last week, based on information in a late issue of the *Engineer*, of London. In the succeeding number of that journal is given some insight to the type of factory provided for machining the shells, the first article dealing with the shell-forging work. Following is the machine shop end of the story, substantially in full:

The site of the plant described was viewed for the first time on Aug. 30, 1915, then under a crop of oats. The whole factory building was completed by March 20, 1916. Meanwhile, on Jan. 12, twelve women were started on machining shells, and the number was increased as the building progressed and machinery was installed. The structure is of a steel framework with galvanized sheets for the walls. At the date of the visit to the factory, it was employing 1725 girls and 314 men, and the works were running from 6.30 a. m. on Monday mornings to 10.30 p. m. on Saturday nights, with breaks only for meals. The men were very largely engaged on setting up and keeping the machines in order. The majority of the laborers, that is to say, those occupied not on the machining of the shells but on such work as carrying the shells from one machine to another, were women. It is expected that ultimately the number of male employees will fall to something less than 5 per cent of the force.

The accompanying general plan shows how the shels pass in parallel lines through the shop, being received at points at the bottom of the plan and and reaching finally the so-called bonding department shown at the top of the plan. The offices of the works are all on one floor. Their inside, outside and partition walls are made from molded cement slabs 2 ft. square and 2½ in. thick. Primarily intended for pavement making, they form excellent building material, for tney become dry and hard very quickly. They are cemented together along their edges, so that the walls are everywhere only 2½ in. thick. In addition to the cement small steel U-shaped pieces are used to bind each neighboring pair of slabs together. The inside and outside walls are stiffened at intervals of 29 ft. by pillars of reinforced concrete, and on the outside, facing the road, the wall is rough cast.

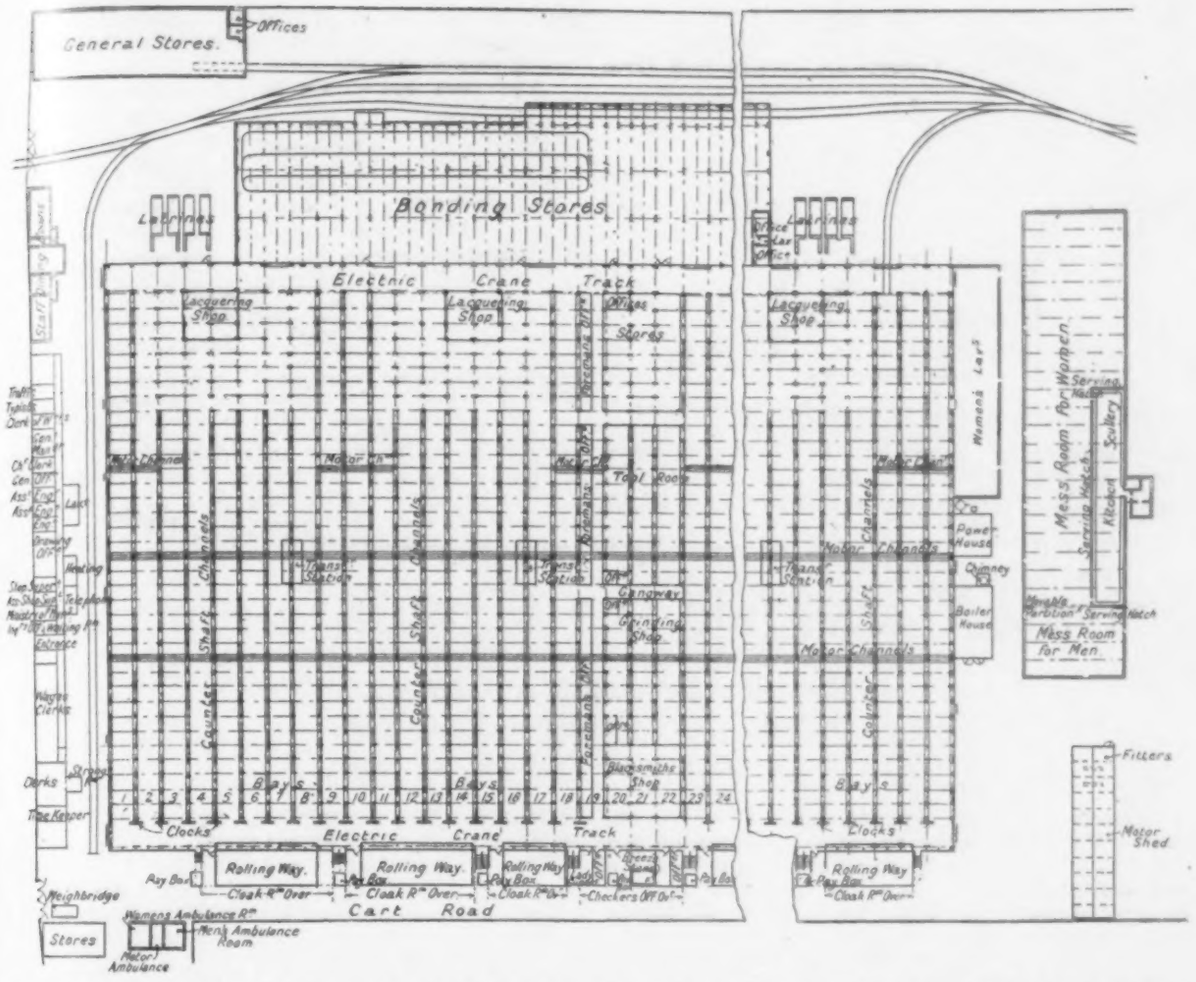
The shells are delivered from tne forging plant, say by automobile trucks. They are dumped on so-called rolling ways. As indicated in an accompanying sketch, the rolling way is built part inside the galvanized iron sheeting and part outside. When the side doors of the trucks are let down the shells may be rolled down the incline to the buffer inside the building. From the table within the wall the operators as required can readily carry the shells to their machines.

Each bay may be said to be self-contained. Down any bay starting from the rolling-way end, one finds on each side of the central passageway a row of machines, each one performing a specific operation on the shell forging. A shell once taken from the rolling-way into a particular bay remains in that bay and on one side of it until, having been passed from one operator to the next, it emerges at the opposite end completely machined.

If we imagine a line drawn at any point of any bay at right angles to its length and passing through a certain type of machine, all the machines lying on this line will be of the same type and will be performing the same operation. Over each such row of machines a separate foreman is placed, so that each foreman has only one class of machines under his charge. To prevent congestion and to secure the maximum output, the quickest and easiest operations are made to set the pace. The more difficult operations are brought into line by providing more than one machine for them in each bay. Thus walking down any bay in the direction in which the work travels, one may notice in places that two or more successive machines on either side are similar and are performing identical work.

The cutting lubricant used is a soap-and-water

Machines Are Operated by Women. The floors are of wood except at every line of columns with the double rows of machines



Shell Forgings Received from Wagons or Motor Trucks at the Rolling Ways, So-Called, Proceed in Parallel Lines Through Identical Machining Operations to the Bonding Stores, Shown at Top of Plan

compound. A central pumping station is provided for the fluid with overhead delivery pipes having branches to each machine, and there is also provided a trench or gulley under the lines of machines, all leading into a main trench and well, wherein the used fluid is collected ready to be strained and returned by the pumps to the overhead delivery pipe. The trench is of concrete. Each half trench is given a fall of 5 in. toward the center of the shop. At each end of the main trench there is a pumping station and a suds well, 5 ft. in diameter by 18 ft. deep.

The machines are cemented down across the concrete suds trenches, no bolts being used. The accompanying sketch will make the method quite clear. The suds trenches of two adjacent rows of machines are united throughout their lengths by a level layer of concrete. The arrangement gives the operators plenty of room to pass behind their machines for cleaning and adjusting them, and at the same time results in the columns being situated where they are least obstructive of room. The columns in general are supported on concrete foundations, 3 ft. square and 3 ft. deep, and are held thereto by means of bolts 18 in. long. Certain of the columns are heavier than the average. For these the depth of the foundation blocks is increased to 4 ft. It will be gathered, then, that the suds trenches and the foundations for the columns form a continuous mass of concrete, which was laid as far as possible without a break.

The floor of the factory, except at the trenches, is of wood—a point which adds not a little to the comfort of the workers. The ground was first leveled with ashes. Thereafter, old railroad ties were laid down at 3-ft. intervals transversely between the columns. These directly support the floor, which is of 2-in. battens running longitudinally. For heating, steam pipes are carried by each row of columns at a height of about 10 ft. above the floor level. The glazing of the roof has been tinted blue by stippling on the inside with washable distemper, as the *Engineer* calls it. This keeps out the direct rays of the sun, and has a very pleasant effect.

It will be seen that the machines in the bay are all driven from one overhead shaft, which runs down the center of each bay. This shaft is carried from the underside of the roof trusses, which insures as high a position as possible. It is driven by electric motors, which are supported high up in the roof. There are either two or three of these motors in each bay, each driving a portion of the line shafting, which serves from 12 to 20 of the machines below. Each machine has a separate counter shaft, situated slightly to the rear of the machine and quite 10 ft. above the operator's head.

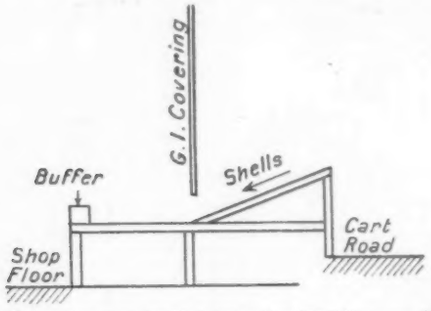
Leaving the lacquering rooms, the shells are conveyed to the bonding store, an adjunct to the main building, which is screened and locked off therefrom. The bonding store may be said to be private government ground. Here government officials take delivery of the shells, which are finally examined and, if found satisfactory, painted externally by women with compressed-air spraying apparatus.

"The control of the girl workers," says the *Engineer*, "so far as what may best be described as domestic matters are concerned, is in the hands of a principal lady supervisor. Under this lady are three sectional lady supervisors, each responsible for a section of the works. Under each sectional supervisor are two assistants. In addition to these, there are one lady canteen supervisor and three canteen assistants. Three fully trained nurses have been engaged, one at least of whom is always on duty. These nurses attend to any cases of accident or sudden illness, and keep a watchful eye on the general health and condition of the girls. Speaking of accidents, it may be remarked that up to the date of our visit none requiring the use of a stretcher had occurred, though these are provided for. As for minor accidents, such as cut and

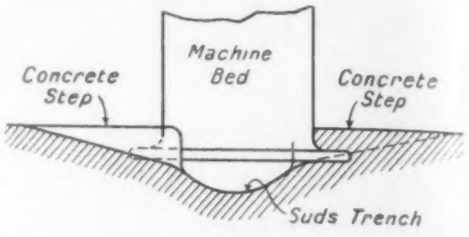
bruised fingers, it is found that on the whole these are more numerous than with men employees."

The hours of the factory are divided into three equal shifts, namely, from 6.30 a. m. to 2.30 p. m., from 2.30 p. m. to 10.30 p. m,, and from 10.30 p. m. to 6.30 a. m. Half-way through each shift there is a break of half an hour for a meal. The figures show, it is stated, that the efficiency of female labor in this factory does not fall off during the night.

The work the women have to do involves lifting weights up to 80 lb. or so and standing for 8 hr., except for the meal-time break. They all seem cheery and happy, and go about their work with a zest.



Shell Forgings Are Rolled into the Building on Ways



The Concrete on Which Machines are Bedded Without Bolts Form Trenches for the Return to a Central Pumping Station of the Lubricating Compound

Private Works and the Army Appropriation

Provisions for Munitions Manufacture Outside of Arsenals — The Work of the Council of National Defense

WASHINGTON, D. C., Aug. 15, 1916.—The army appropriation bill as finally agreed to in conference and adopted by both houses, though a compromise as to the total amount carried, is in several important respects more satisfactory than either the House or the Senate bill. This is especially true of the provisions relating to the manufacture and purchase of ordnance, which have been freed of all ambiguity and now represent a reasonable approximation to the recommendations of General Crozier and the Secretary of War. The terms of the bill have also been so clarified that private manufacturers may easily estimate the amount of business obtainable.

The army budget, as finally accepted, carries $267,597,000, a reduction of about $46,000,000 from the Senate bill but an increase of $85,000,000 over the measure as it passed the House. While the pruning knife was applied to all the appropriations for ordnance material made by the Senate, these figures were not reduced proportionately to other allotments. For the manufacture and purchase of ammunition for small arms for reserve supply, etc., the House appropriated $4,500,000, which the Senate increased to $12,776,000, while the conference bill carries $10,000,000. As to this item the House stipulated that not more than $2,000,000 might be used in the purchase of ammunition, a provision which the Senate struck out, inserting in lieu thereof the vague and unsatisfactory limiting clause that "the Government shall manufacture at its arsenals as much of said ammunition as can be produced, operating said arsenals at full capacity, if necessary, but having due regard to economy and efficiency in operation." This limitation the conferees struck out, substituting a definite stipulation that not more than $5,000,000 of this appropriation may be used in the purchase of ammunition, thus dividing the total appropriation equally between the Government arsenals and the plants of private manufacturers. The so-called Tilson amendment, which has been a bone of contention between the two Houses, was also adopted by the conferees in the form of an additional proviso, as follows:

> That $250,000 of this appropriation may be used to procure gages, dies, jigs, tools, fixtures and other special aids and appliances, including specifications and detailed drawings necessary for the manufacture by the Government and by private manufactures of ammunition necessary for the use of the land forces of the United States in time of war, and in the purchase of lots of ammunition to complete the object of this proviso the existing laws prescribing competition in the procurement of supplies by purchase shall not govern in orders not to exceed $50,000 in any one case.

For the manufacture and purchase of ammunition and other accessories for small-arms, hand and machine gun target practice, for which the House allowed $1,200,000 and the Senate $3,494,000, the conference bill carries $3,000,000, of which one-half is made available for purchases in the open market or by contract and the stipulation that the arsenals shall manufacture as much of this material as can be economically and efficiently produced was stricken out. The appropriation provided by the House bill for manufacturing, repairing and purchasing arms for the national guard, amounting to $5,000,000, was adopted by the conferees, together with the proviso that $200,000 of the appropriation may be used to procure the equipment for private manufacturing plants to produce these arms. The conferees also agreed that orders not to exceed $50,000 in any one case may be placed under this appropriation without competition.

With a view to bringing up to date a large amount of more or less obsolete ordnance material the conference bill provides $9,500,000, and the Secretary of War is authorized to sell, at prices to be fixed by the Chief of Ordnance, to the Government of Cuba such ordnance and equipment as may be desired by that government and approved by the President of the United States.

An unusual provision is embraced in the conference bill for the purchase or manufacture of automatic machine rifles. The House bill appropriated $5,600,000 for this purpose, and the Senate raised the amount to $14,311,150. The conference measure puts the amount at $12,000,000, and provides that this appropriation shall be available until the close of the fiscal year ending June 30, 1918. It is understood that the object in extending the period in which this money can be used is to enable the Ordnance Bureau to make exhaustive tests of new guns and to take every advantage of the lessons of the European war.

The bill as agreed to in conference carries $500,000 for the purchase and manufacture of armored motor cars, but it is understood that practically all of these cars will be bought from private manufacturers although special equipment may be installed thereon by the Government.

One of the most important items in the army bill provides for the purchase and manufacture of field artillery for the national guard, which will be supplied in unprecedented quantities in accordance with the rec-

ommendations of experts who have acted as official observers for the War Department in the chief theaters of the European war. The House set aside $8,000,000 for this purpose, but the Senate raised the figure to $14,200,000. The conference bill carries $10,000,000 for this purpose, of which one-half may be used for open market or contract purchases. The conference bill also carries $10,000,000 for the manufacture and purchase of ammunition for field artillery, one-half of which may be used to buy ammunition. Both the appropriations for artillery and for ammunition are made available until the end of the fiscal year 1918. The sum of $200,000 of the appropriation for field artillery ammunition is authorized to be spent for special equipment to be installed in private plants, the output of which the Government may buy to the extent of $50,000 in any one case without competitive bidding.

ADVISORS ON NATIONAL DEFENSE

The various propositions for the formation of a so-called council of executive information were debated by the conference committee at some length, and the one finally adopted provides for a council of national defense for the co-ordination of industries and resources for the national security and welfare, to consist of the Secretary of War, the Secretary of the Navy, the Secretary of the Interior, the Secretary of Agriculture, the Secretary of Commerce, and the Secretary of Labor. This council is to nominate to the President for his appointment an advisory commission, consisting of not more than seven persons, each of whom shall have special knowledge of some industry, public utility, or the development of some natural resource. The advisory commission shall hold such meetings as shall be called by the council or be provided by the rules and regulations adopted by the council for the conduct of its work.

It shall be the duty of the Council of National Defense to supervise and direct investigations and make recommendations to the President and the heads of executive departments as to the location of railroads with reference to the frontier of the United States so as to render possible expeditious concentration of troops and supplies to points of defense; the co-ordination of military, industrial and commercial purposes in the location of extensive highways and branch lines of railroad; the utilization of waterways; the mobilization of military and naval resources for defense; the increase of domestic production of articles and materials essential to the support of armies and of the people during the interruption of foreign commerce; the development of seagoing transportation; data as to amounts, location, method and means of production, and availability of military supplies; the giving of information to producers and manufacturers as to the class of supplies needed by the military and other services of the Government, the requirements relating thereto, and the creation of relations which will render possible in time of need the immediate concentration and utilization of the resources of the nation.

The bill appropriates $200,000 to be immediately available for experimental work and investigations undertaken by order of the council.

Since July 1 the military establishment has been supported under a joint resolution continuing the appropriations of the fiscal year 1916, but the entire army budget as agreed to by the conference committee is now available. W. L. C.

Siberian members of legislative bodies at a late meeting in Petrograd voted to urge the government to adopt measures for the development of the iron industry in the Kuznetsk, Yenesei and Maritime regions. The conference contended that the government should make certain guarantees to private promoters of blast furnaces and foundries, and should encourage the establishment of machine shops for making agricultural and gold-mining machinery by means of special bounties. According to an article in *Russia*, published by R. Martens & Co., Inc., 24 State Street, New York, investment of foreign capital must be for prolonged terms, and the exploitation and direction of the undertakings must remain under Russian influence.

No. 1 furnace of the Woodward Iron Company, Woodward, Ala., was blown out for relining July 22.

Judicial Decisions

ABSTRACTED BY A. L. H. STREET

PRIORITY OF CONDITIONAL SALE CONTRACT.—Where the owner of a mortgaged mill bought a new boiler to replace an old one, agreeing that title to the new one should remain in the seller until payment of the price, and the mortgagor of the real estate afterward became owner under foreclosure of the mortgage, the seller of the new boiler was still entitled to recover possession as against the mortgagee's claim that the boiler had become a part of the land, especially if it could be removed without substantial injury to the real estate. The intention of the parties to a contract for installation of machinery in a building is one of the strongest elements in determining whether the machinery has become a part of the realty. Notice to a prior mortgagee of real estate of a conditional sale agreement by which the seller reserves title is not essential to preserve the rights of the seller. (Kansas Supreme Court, Bromich vs. Burkholder, 158 Pacific Reporter, 63.)

FIRM'S GOOD WILL AS PARTNERSHIP ASSET.—The good will of a business partnership, including the firm name, constitutes a part of the partnership assets, in the absence of express agreement to the contrary. (New York County Surrogate's Court, In Re Borden's Estate, 159 New York Supplement, 346.)

DUTY TO MAINTAIN LADDER IN SAFE CONDITION.—The section of the New York labor law which makes an employer liable for injury to a workman, resulting from a defect in ways, works or machinery, covers a ladder provided for use of employees as a permanent means of passing from one floor to another in the performance of their duties. (New York Supreme Court, Appellate Division, Mizak vs. Carborundum Company, 159 New York Supplement, 274.)

MISSOURI FOUNDRY LAW VALID.—The law enacted by Missouri in 1913, requiring operators of foundries in which 10 or more men are employed to provide suitable toilet rooms, containing washbowls or sinks provided with running water, hot and cold, water closets connecting with running water and a suitable place where men may change their clothes, properly heated, ventilated and protected with a suitable locker, is valid, and not unconstitutional as a discrimination in favor of other industries not required to furnish similar facilities. (Missouri Supreme Court, State vs. Scullin-Gallagher Iron & Steel Company, 186 Southwestern Reporter, 1007.)

PROOF REQUIRED IN MACHINERY ACCIDENT CASE.—An operator of a metal punching machine cannot recover against his employer for injury resulting from a splinter of metal flying out of the machine, without proving that defects in the machine caused the accident, or that the employer was negligent in some way. Negligence will not be presumed. (Pennsylvania Supreme Court, Kalenski vs. John Wood Mfg. Company, 97 Atlantic Reporter, 939.) But negligence of an owner of a rolling mill in failing to safeguard spindles on it may be inferred to have been the cause of the death of a boss roller who was drawn between them while adjusting set screws or greasing the rolls in the performance of his duties. (Pennsylvania Supreme Court, Sparrow vs. Scranton Bolt & Nut Company, 97 Atlantic Reporter, 941.)

LIABILITY FOR DEFECTS IN STRUCTURAL STEEL.—A contracting builder is not entitled to recover damages against a manufacturer of structural steel on account of latent defects in it, where, on account of having installed it in a building after proper inspection and purchase of the steel from a reputable manufacturer, the builder was absolved from any legal liability to the owner of the building, and hence sustained no damage. (St. Louis Court of Appeals, Flannery vs. St. Louis Architectural Iron Company, 185 Southwestern Reporter, 760.)

INJURIES CAUSED BY DEFECTIVE WRENCHES.—The New York labor law, which makes employers liable for injuries resulting from defective ways, works, machinery or plants, includes injuries caused by defective monkey wrenches. (New Jersey Supreme Court, Hamm vs. Rockwood Sprinkler Company, 97 Atlantic Reporter, 731.)

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY

GEO. W. COPE W. W. MACON

CHARLES S. BAUR, *Advertising Manager*

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A Cure for Transverse Fissures

Failures of steel rails through transverse fissures, which have baffled railroads and steel works, both as to cause and cure, are likely hereafter to diminish. At least Dr. P. H. Dudley of the New York Central Lines believes he has reached the root of the trouble, and he suggests the remedies. His notable contribution elsewhere in this issue is certainly not unconvincing, in spite of the fact that as a railroad man and user he places the burden of solution on the producer; and his authoritative position on rail matters and his long-continued investigations add weight to his opinions.

No question is raised as to segregation in the steel, but instead stress is laid on the need of care in rail manufacture that there shall be a uniformity in crystalline structure. Otherwise a part of the rail head interior may have relatively little ductility and in being straightened in the gagging press, this part may be fractured or checked. The delayed crystalline transformation, it is explained, may be due to rapid cooling of the occasional rail by the rolls, to cooling by gusts of cold air, as on the hot beds, and to rolling without reheating the bloom. By the last is not meant heating the bloom from atmospheric temperature but subjecting it immediately after the blooming passes to an hour's passage through a furnace so that the temperature may be raised, say, approximately 300 deg., before proceeding through the rail mill proper.

Dr. Dudley emphasizes the combination of the rail of imperfect structure and its severe straining by the gagging press as the causes of the check, so that all that remains to bring about ultimate failure is the moving of heavy wheel loads, as in service in the track. In this connection he argues for a wider span than now common in the support of the rail in the gagger, to reduce the strain to which the rail may be subjected, particularly in careless operation of the press. Incidentally, if this contention is admitted, it would seem that a new impetus will be given to the use of special straightening rolls, on which at least one patent has been granted. This comprehends the passage of the rail through a series of rolls which serve to subdivide the bending pressures, being substantially a continuous process and eliminating the judgment of the machine operator.

What appears to be particularly new in the Dudley investigation is the claim of the definite impress of the blow of the gag press in the rail head at the point of the origin of the fissures. This imprint, so called, is a sub-surface one, and the transverse fissures so produced are divided into two classes.

The simple transverse fissure appears to be that caused when the base of the rail has been convex and the metal in the base must be shortened. Specimen rail sections in Dr. Dudley's laboratory in New York indicate a small checking in the head under such a condition, forming the nucleus for the fissure. The other and more complex fissure, he finds, is developed from the gagging of the head—that is, when the head needs the shortening. In this a more or less horizontal check occurs, somewhat central in the head and also a more or less vertical check joining the horizontal. Growth of the fissure then appears to go on in service in both the longitudinal and transverse directions. To prove this contention, the part of the rail over the fissure is removed, showing a nucleus so far below the surface as to make it difficult, in Dr. Dudley's opinion, to regard it as due, for example, to sliding train wheels, which ought to show a fissure growth away from the surface rather than toward it.

An important fact not brought out in the report is that the fissures do not all occur on the gage side of the rail, or under the rolling loads, as has been claimed. The New York Central's records so far indicate that 21 per cent of the transverse fissures have developed from points beyond the central axis of the section. The view is that the location of the nucleus of the fissure is due wholly to the point of application of the gag.

The observations of the rail mills will be of interest. Even if there are those who doubt that Dr. Dudley's discovery is all he believes it to be, the mill practices he advocates are already followed in part in a number of mills or are capable of the modification suggested. But if the mills make the changes in the spirit of forwarding a wholesale experiment, they will probably ask for something above the market price to help pay for the additional investment.

Some idea of the enormous proportions of the shell orders taken in the United States for the Allies is given by a statement in the report of the American Locomotive Company for the year ended June 30, 1916, which appeared in the past week. The war orders on the books of that company on

June 30, with others taken in the past few weeks, are put at $41,642,905. It is understood that "war orders," as used in the report, applies to shrapnel and large shells for which the company bought special equipment in the past year. When it is considered that the American Locomotive Company's business in these lines is but a fraction of the total, it will be seen that the munitions contracts involving the use of steel which are now on the books of manufacturers in this country amount to hundreds of millions of dollars.

Testing the Balance of Steel Mills

It is a common observation in the steel trade that the present time furnishes an exceptional opportunity for testing the "balance" of a steel mill, for with the extremely heavy pressure for output the weak links in the chain are readily disclosed. In times of only moderately full operation the various departments are not usually given a test as to what they could do under pressure, but when the pressure comes it is found that some operations can be speeded up more than ever.

Taking the steel industry as a whole it is evident that blooming and billet rolling capacity is short relative to ingot making capacity. There are offerings of ingots by mills which will not sell blooms or billets, but when the prospective purchaser of the ingots seeks a mill to roll them his quest is usually fruitless. A considerable tonnage of ingots has been exported not because the foreign buyer desired ingots but because that was the only form of unfinished steel he could secure. A somewhat curious fact, however, is that the ingots have brought very nearly the billet price. They have not become a drug on the market. The present surplus of ingots appears to represent the final adjustment after various deals have been made whereby one steel mill, with a surplus of ingots, ships to another mill with a surplus of rolling capacity. When conditions as to labor and equipment make the undertaking feasible both parties will address themselves to the rounding out of their operations, the one increasing ingot-making capacity and the other increasing rolling capacity.

In one respect, however, the present period of high pressure is a poor one in which to determine how the capacities of different departments should be modified in order to meet normal requirements; for present conditions are abnormal not only as to the pressure for steel in general, but also as to the distribution of demand among the different products. The demand for plates is abnormally heavy, while the demand for structural shapes is proportionately light, and there are many other divergences. There is nothing in present experience to show whether the various finishing departments are well balanced with each other.

In the larger plans on the boards for new construction work in the steel industry there is no reflection of the present abnormal demand for specific products. There is no disposition, for instance, to build plate mills for the future, although in substance the current market reflects a premium of $8 a ton on plates for 1917 delivery, that being the extra price commanded above structural shapes and bars when in the past the three products have held at substantially the same level. Nor is there a disposition to increase rail mill capacity, although the rail mills find difficulty in arranging rail deliveries even for the late months of next year, their capacity at present being absorbed so largely in the ephemeral business of rolling large rounds.

It is quite significant, indeed, that the one branch of the finished steel industry that promises the largest expansion in capacity in the next year or two is the one whose export trade has been curtailed by the war, without any compensating advantage of "war orders" of any description. The Steel Corporation is building a complete pipe plant, while one independent is adding a pipe department and another is largely increasing its facilities by building a Bessemer steel plant. While there are no statistics of wrought pipe exports prior to the war there is no question that the exports lately have been less than they were in 1912 and 1913, and the statistics of production of all welded tubular goods in 1915 show a decrease of 15 per cent from the output in 1913, the first year for which production statistics are available, this decrease occurring when the total production of iron and steel was substantially unchanged. The new construction in the pipe industry is thus based purely upon expected conditions after the war, with no consideration of present abnormal conditions.

Europe's Lesson in Industrial Efficiency

European manufacturers are learning rapidly and well the value of a high standard of industrial efficiency. According to the observations of Americans who have been in close touch of late with conditions abroad, production is being carried forward with a degree of intensity which formerly existed only in isolated cases. This is true not only in the metal trades, but in many other lines, for the needs of armies and navies to-day are extremely diversified, and the wants of the civil population must be cared for with a smaller capacity for producing. This progress toward the adoption of what have been called American methods in machinery manufacture will have to be reckoned with when the war is over.

The old way in Europe was for the manufacturer to produce a great variety of product. A machine shop could furnish about anything from a small machine to a steam engine, a practice which naturally held back the best development of individual products, as contrasted with concentrating upon more closely defined lines and constantly striving to bring a few products to a maximum of excellence at a minimum of cost. Also the European manufacturer required of his average employee a greater range of usefulness than is now common in the United States. To take the American machine shop, for example, it has been said over and over that the true journeyman mechanic is becoming rarer each year. He has been succeeded by such specialists as the lathe hand, planer hand, grinding machine hand and so on. Even were a liberal supply of all around machinists available to-day, a very large part of them would be distributed among the several groups of machines, each to specialize in one department of the work. Naturally a man comes to his highest efficiency

under such circumstances. The idea goes much farther, another familiar fact being that the planning department assists production by exact determination of the way in which each individual job can be done most expeditiously and cheaply. It co-operates with the workman to secure maximum production. This concentration of effort extends to the selection of equipment, that output may not be curtailed by machinery and tools not best suited to the work. Such practices have now been introduced into the manufacturing methods of European countries on a scale beyond anything attempted heretofore.

The employment of women and inexperienced men in great numbers to replace workmen who have gone to war has made necessary this specialization of training and employment. Under the conditions obtaining, the average novice could scarcely be taught more than to operate one machine on a limited range of work; a woman could not be made a skilled mechanic in a few months. Skillful planning was imperative.

It is also to be borne in mind that many skilled workers were returned from the armies to the shops in the metal trades, since they could render better service in making munitions than in fighting in the trenches. On the whole, it is entirely reasonable to expect, under the methods now applied, that the total efficiency of the metal-working industries in the belligerent countries after the war will be greater than it was two years ago, in spite of the war's inroads upon the ranks of workers.

Decrease in Steel Corporation's Orders

The monthly statement of the United States Steel Corporation for July showed a decrease of only 46,866 tons in unfilled orders on its books. The total at the close of business July 31 was 9,593,572 tons. The decrease in June was 297,340 tons, which was the first falling off since August, 1915. The following table shows the unfilled tonnage for each month commencing with January, 1913:

	1916	1915	1914	1913
January	7,922,767	4,218,571	4,613,680	7,827,368
February	8,568,966	4,345,371	5,026,440	7,656,714
March	9,331,001	4,255,749	4,653,825	7,468,956
April	9 829,551	4,162,244	4,277,068	6,978,762
May	9,937,798	4,264,598	3,998,160	6,324,322
June	9,640,458	4,678,196	4,032,857	5 807,317
July	9,593,592	4,928,540	4,158,589	5,390,356
August	.....	4,908,445	4.213,331	5,223,468
September	.....	5,317,618	2,787,667	5,003,785
October	.....	6,165,452	3,461,097	4,513,767
November	.....	7,189,489	3 324,592	4.396,347
December	.....	7.806,220	3,836,643	4,282,108

The Steel Corporation's production of ingots in July is estimated at about 1,300,000 tons, a considerable falling off from the rate of June. The shipments of rolled products are put at about 950,000 tons.

A reduction of the freight rate on steel between St. Louis and Kansas City, obtained from the Public Service Commission of Missouri by the Christopher & Simpson Architectural Iron Company, comes before the courts of Missouri, a writ of certiorari having been obtained by the railroads interested on the allegation that the rate is discriminatory against Kansas City and St. Joseph.

The Link-Belt Company, Chicago, Ill., is enlarging its malleable foundry at Indianapolis in order to meet increased demands. The foundry extension will be a one-story building, 70 x 275 ft., with a wing 106 x 140 ft. It will house the company's fifth melting furnace and will provide space for 60 molders.

AMERICAN LOCOMOTIVE'S YEAR

Company's Financial Condition Better Than Ever Before in Its History

The report of the American Locomotive Company for the fiscal year ended June 30, 1916, shows a balance available for dividends of $10,769,429, which surpasses the best previous record by $4,411,222. In the fiscal year 1914-15 operations showed a deficit of $3,241,980. The income account for the past two years compares as follows:

	1915-16	1914-15
Total receipts	$59,316,016	$9,303,298
Expenses and depreciation	48,245,582	10,445,900
Net profits	11,070,434	*1,142,602
Interest charges	301,005	349,379
Surplus	10,769,429	*1,491,980
Preferred dividends	1,750,000	1,750,000
Surplus	9,019,429	*3,241,980
Appropriation for additions and betterments	3,000,000	.....
Surplus	$6,019,429	*$3,241,980

*Deficit.

In the accompanying remarks to the stockholders, S. L. Schoonmaker, chairman, says in part as follows:

"In arriving at the profit of $10,769,428 there has been deducted from earnings the sum of $1,761,682 for depreciation on all classes of property. There has also been charged against the profits for the year the entire cost of all new equipment of every description purchased for use on munitions work, together with the cost of alterations of plants in connection with such work. In addition to the foregoing a sufficient amount has been set aside from this year's earnings to provide for the cost of eventually restoring the two plants now making munitions to the best conditions for locomotive work when resumed at such plants.

"The net profits for the year exceeded by $4,411,221, or 69 per cent, the profits of the best previous year of the company, which was in 1906-07. This good showing was due to the successful execution of the company's munitions orders.

"On July 1, 1916, there was paid $1,386,000 of gold notes, maturing at that date, leaving a balance of all outstanding gold notes of $1,336,000, maturing July 1, 1917. This shows a reduction of $8,734,000 since 1912, when the notes and loans payable were $10,100,000. The net working capital on June 30, 1916, was $21,482,078, which is ample for the needs of the company to carry on its regular locomotive business.

"Having charged to the 'reserve for liquidation of the automobile business,' all losses incurred to date in the liquidation of the assets and liabilities of the automobile department, there remained an unused balance in the liquidation reserve account of $453,325, which has been restored to the accumulated surplus of the company.

"The Rogers plant at Paterson, N. J., and the Manchester plant at Manchester, N. H., having been retired from the service of the company, are in process of being dismantled. Both are antiquated in construction and equipment and could not be operated economically without the expenditure of large sums. Their book value has been written down in the cost of property account to an amount which, it is conservatively estimated, will be realized from the sale of these properties and the estimated book loss involved, $800,742, charged against the accumulated surplus of the company.

"The amount of unfilled locomotive orders on the books on June 30, 1916, was $19,376.532, as compared with $5,838,235 on June 30, 1915. Practically all of the munitions orders which were on hand at the beginning of the year have been completed and shipped. The unfilled munitions orders on the books on June 30, 1916, together with the munitions orders taken since, amount to $41,642,905."

The Russian Government has bought nine mogul-type locomotives, weighing 37,000 lb., of the American Locomotive Company.

Canadian Metal Imports from United States

Statistics of Imports in Fiscal Year Ended March 31, 1916—Of Total Metal Imports 97 Per Cent Came from United States

BY W. L. EDMONDS

TORONTO, Aug. 12, 1916.—The significant feature of Canada's foreign trade for the fiscal year ended March 31, 1916, was the increase in the imports of iron, steel and other metals and machinery. The total value of merchandise imported for home consumption was $507,783,361, which was an increase of slightly over 10 per cent as compared with the previous year. Of this total $370,497,867, or 73 per cent, came from the United States, being an increase of nearly 20 per cent. But it is when we come to analyze the figures in regard to the imports of iron, steel, other metals and the manufactures thereof that the predominance of the United States in the Canadian market is found to be the most marked as compared with other countries.

Under the wide and general classification of "metals, minerals, and manufactures thereof" Canada last year imported from all countries $103,413,740 worth, as compared with $84,365,978 in 1915, an increase of 18.44 per cent. Of this $3,743,897 was brass and its manufactures; $4,443,077 copper and its manufactures; $1,672,955 agricultural implements; $20,333,966 machinery, and $76,323,832 iron and steel and manufactures thereof.

Under each of these classifications there was a substantial increase in the imports from the United States. The total value of the brass and its manufactures imported from the United States was $3,631,589, an increase of 27¾ per cent; copper and its manufactures, $4,428,729, an increase of 20.82 per cent; agricultural implements, $1,672,955, an increase of 7.41 per cent; machinery, $19,645,894, an increase of 32.52 per cent; iron and steel and manufactures thereof, $71,425,737, an increase of 22.39 per cent.

CANADA WOULD HAVE BOUGHT MORE IF AVAILABLE

Substantial as these increases were, they undoubtedly would have been more so could Canadian importers have obtained all the material they wanted. During the earlier part of the fiscal year they experienced little or no difficulty in this respect, but their experience was altogether of another kind when the home market in the United States developed the extraordinary activity which has characterized it for some time. In spite of the fact that the mills of Canada are turning out a larger and a more varied quantity of steel than ever before, yet metal-working plants, and particularly those engaged in making munitions, have frequently been at their wits' end for supplies. This condition of affairs still largely obtains.

While one cannot speak with certainty upon the point, yet it is no idle venture to say that had the mills in the United States been in a position to supply to the limit the Canadian demand, the imports of iron, steel, other metals and their manufactures from our southern neighbor would have been a great deal nearer the high records of 1913 and 1914 than they were. As it is, notwithstanding the increase over 1915, the value of such imports during the fiscal year 1916 was less by 26.60 per cent than in 1914 and 40.83 per cent less than in 1913, the record year. In machinery the decrease compared with 1914 was about 24 per cent and compared with 1913 about 45 per cent.

But while Canada's imports of machinery and iron and steel and manufactures thereof are in value below those of the fiscal years 1913 and 1914, yet the proportion obtained from the United States as compared with the total from all countries was larger. In machinery the proportion was 96.61 per cent, as against 88.89 in 1914 and 91.61 in 1913. In iron and steel and manufactures thereof the proportion was 93.71 per cent in 1916, compared with 82.78 in 1914 and a little under 87 per cent in 1913.

INCREASE OF 32½ PER CENT IN MACHINERY

Many of the increases in the imports in the fiscal year 1916, as compared with 1915, are most marked. That which is classified as "other machinery" increased by $4,126,945, or nearly 51 per cent. Threshing machine separators and parts increased by over 77 per cent. In engines with portable boilers there was a gain of nearly $500,000; in mining, smelting and reducing machinery, $148,386; in rolling mill machinery, $71,000; in beet root sugar machinery, $37,604. But the highest percentage of gain was in carding, spinning and weaving machinery, the increase being a little over 200 per cent.

The increases in other lines of machinery imported from the United States were as follows: Windmills, $268; washing machines, $9,085; traction ditching machines, $1,384; sewing machines and parts, $35,484; ruling and bookbinding machinery, $6,663; printing and lithographing presses, $14,675; hay presses, $8,765; fodder and feed cutters, $28,376; fanning mills, $17,343; electric dental engines, $4,174. As already pointed out, the total gain in machinery imports from the United States was over 32½ per cent.

The decreases in machinery were: Cement, $17,746; coal-handling, $98,733; concrete mixing, $34,252; cordage, twine and linen machinery, $4,773; cranes and derricks, $62,610; gold mining, $93,448; paper and pulp, $64,543; newspaper printing presses of a kind not made in Canada, $189,519; saw-mill machinery, $3,642; steam and electric shovels, $55,496; type-casting and type-setting machines, $162,834; well-digging machinery of a kind not made in Canada, $207,264; ore crushers and stamp mills, $38,912.

The decrease in the importation of cement and concrete machinery is a reflection of the dullness which has been characteristic of the construction and building trades in Canada for the past two years. Some improvement has, however, taken place in these trades in recent months. The increased attention which is being given to the mining industry should also lead to an increase in the importation of mining machinery. The output of the mines of Canada last year had a total value of $138,513,750, an increase of $9,650,000 over the previous year. That there will be a further increase this year there can scarcely be any doubt.

PRINCIPAL INCREASES IN IRON AND STEEL PRODUCTS

The principal increases in iron and steel and manufactured products were as follows: Pig iron, $111,161; sheets, 14 gage and thinner, $852,356; galvanized sheets, $341,978; tin plates, $675,040; Canada plates and Russian iron and terne plate, $80,431; skelp for pipe manufacturers, $280,712; locomotive tires, $139,684; barb wire, $393,477; galvanized wire, $355,203; plates and sheets, $470,536; structural steel, $254,449; plow plates, $106,337; nuts, rivets and bolts, $49,848; hand tools, $62,940; pumps, hand, $35,107; boiler tubes, $78,458.

The principal increases in copper products were: Rods, $575,142; blocks and pigs, $30,555; tubing, $94,099. In brass products the principal increases were: Rough blanks for cartridge manufacturers, $448,039; wire cloth, $85,532; tubing, $63,542. Spelter imports from the United States increased by $1,551,963.

The recovery in the import trade with the United States, which has been so marked in many lines appertaining to iron and steel, has so far failed to register

in railroad supplies, there having been during the past year a further general decline, except in locomotive tires. Steel rails dropped from $4,901,851 in 1914 and $704,468 in 1915 to $208,188. With the exceptional prosperity which the railroads are now enjoying, the figures for the fiscal year 1917 should chronicle a marked change for the better.

The accompanying table gives the principal imports into Canada from the United States during the fiscal year 1916, together with the total from all countries.

Principal Canadian Imports from United States and All Countries in Fiscal Year Ended March 31, 1916

	From United States	From All Countries
Agricultural implements and parts	$1,656,641	$1,672,955
Angles, beams and channels	3,181,020	3,182,431
Axles and axle parts	1,190,283	1,191,694
Bars, bands, hoops, sheets etc., greater value than 3½c. per lb	1,822,810	2,432,884
Bar iron or steel	2,502,357	2,565,614
Billets of iron or steel	1,086,816	1,087,858
Bridges and parts and structural work	59,450	61,006
Castings and malleable iron	1,257,231	1,266,043
Chain for agricultural implements	118,580	118,690
Chains, n.o.p.	171,302	201,211
Cream separators and parts	492,735	505,614
Cutlery of all kinds	301,925	597,326
Boilers of all kinds and parts	186,450	238,672
Gasoline and gas engines	3,376,288	3,408,649
Locomotives	190,617	195,483
Locomotive parts	76,365	76,365
Motor cars for railroads and tramways	27,014	27,014
Pumps, power, and parts	618,198	637,780
Steam engines	94,933	107,399
Ferrosilicon, spiegeleisen, etc.	377,770	1,010,864
Flat eye-bar blanks for bridge and structural work	237,505	237,505
Forgings of iron or steel	759,344	761,339
Guns, rifles, etc.	486,259	508,571
Parts of guns, rifles, etc.	687,868	689,036
Tools and machinery for manufacture of rifles	459,260	459,416
Builders', cabinetmakers', saddlers' hardware, etc.	494,828	534,835
Hoop, band, scroll or strip	724,33	736,437
Ingots, blooms, puddled bars, etc.	375,319	384,787
Locks of all kinds	200,020	202,955
Adding machinery	145,815	146,815
Carding, spinning and weaving machinery	979,009	1,028,269
Cement-making machinery	24,321	25,474
Coal-handling machinery	37,748	37,867
Concrete-mixing machinery	29,048	29,048
Cordage, twine, linen machinery	24,822	26,369
Cranes and derricks	275,625	276,396
Engines, portable, with boiler in combination	1,166,967	1,168,345
Fanning mills	34,201	34,201
Fodder or feed cutters	39,209	39,209
Gold-mining machinery	88,940	136,612
Hay presses	38,043	38,043
Mining, smelting and reducing machinery	595,983	607,591
Ore crushers, stamp mills and compressors	328,939	355,126
Paper and pulp mill machinery	319,247	446,866
Portable machinery, n.o.p.	42,793	42,793
Printing and lithographic presses	235,169	246,468
Newspaper printing presses	145,015	159,186
Rolling-mill machinery	179,687	179,687
Bookbinding machinery	158,086	159,294
Saw and planing mill machinery	136,840	137,365
Sewing machines	307,998	328,204
Sewing machine parts and attachments	121,088	135,838
Shovels, steam and electric	99,300	99,300
Threshing machine separators and parts	912,191	912,818
Traction ditching machinery	80,116	80,116
Typecasting and typesetting machinery and parts	322,764	323,063
Typewriters	377,024	377,282
Washing machines, domestic	71,750	72,073
Machinery not specified	12,218,101	12,574,474
Nail rods for horseshoe makers	25,659	25,659
Nails, brads, spikes and tacks	31,851	32,779
Wire nails	36,485	36,529
Needles of all kinds	101,020	170,473
Nuts, rivets and bolts	184,923	187,130
Iron ore	1,735,332	2,518,286
Pig iron	731,583	741,278
Pipe, cast iron	65,927	132,874
Pipe fittings	452,208	457,557
Plates rolled, not less than 30 in. wide and ¼ in. thick	1,092,329	1,092,517
Plates or sheets, rolled n.o.p.	558,518	564,803
Plates or sheets, steel, cold rolled, etc., over 14 gage	25,407	25,407
Plates, universal mill, over 12 in. wide	896,074	896,074
Plow plates, etc.	241,762	241,799
Pumps, hand, n.o.p.	133,947	134,647
Rails for railroads and tramways	308,188	308,188
Railroad fish plates	49,611	49,611
Railroad spikes	27,410	27,613
Railroad switches, frogs and crossings	44,209	44,647
Railroad tie-plates	10,938	10,938
Rolled rods for chain making	60,691	60,691
Safes and vaults	59,492	59,519
Scales and balances	79,708	85,448
Scrap of iron and steel	59,889	61,529
Screws, iron and steel, n.o.p.	71,941	72,352
Shafting of all kinds	87,132	87,353
Canada plates, Russian iron, terne plates and rolled sheets of iron or steel	524,330	632,228
Sheets, flat, galvanized	1,161,156	1,577,828
Sheets, rolled, polished or not, 14 gage and thinner, n.o.p.	2,095,912	2,181,256
Sheet steel, crucible, for mower and reaper knives	28,071	28,568
Angles, beams, knees, plates, etc., for ships	388,332	391,939
Manufactured articles of iron and brass for ships	216,674	239,152
Skates of all kinds	33,363	33,363
Skelp for making iron or steel pipe	2,394,305	2,394,305
Springs for railroad and other vehicles	197,233	197,941
Steel, rolled for saws, straw cutters, etc.	108,217	130,243
Stoves of all kinds	220,482	225,468
Surgical and dental instruments	332,035	357,433
Tires, locomotive and carwheel, in rough	263,316	319,322
Hand tools	754,885	801,585
Tubes for boilers	358,518	364,143
Tubing for iron or brass beds	177,308	177,802
Tubing or pipe of iron or steel, plain or galvanized	385,579	389,503
Tubing, seamless, not less than 3½c. per lb.	75,597	75,597
Tubing, wrought iron or steel, seamless, plain or galvanized	343,176	346,308
Enameled ware	125,918	134,782
Iron or steel hollow ware, n.o.p.	92,480	98,186
Barbed fencing wire	1,020,639	1,020,639
Wire for mattresses	46,703	46,703
Buckthorn strip, woven, and wire fencing not above 9 gage	27,365	30,316
Crucible cast steel wire not less than 6c. per lb.	65,879	65,879
Galvanized wire, Nos. 9, 12 and 13	1,636,960	1,636,960
Wire, single or several, covered	159,524	165,595
Steel flat corset wire	64,118	64,118
Steel wire, for rope making	71,650	116,905
Wire cloth	146,554	163,631
Wire rope and wire cables	136,384	281,407
Other wire, not specified	176,225	179,130
Wire rods, not over ¾ in. diameter	1,904,705	1,904,705
Tin blocks, pigs or bars	274,064	1,167,601
Tin plates and sheets	3,256,156	3,415,306
Tinfoil	197,760	201,493
Tinware	435,328	527,939
Zinc blocks, pigs, sheets, rods, etc.	236,673	237,414
Spelter	2,129,133	2,131,566
Alumina	987,517	988,062
Aluminum in ingots, strips, plates, etc.	582,562	700,365
Aluminum, manufactures of, n.o.p.	73,735	77,842
Buckles of iron, steel, brass and copper	135,641	137,779
Gas, oil and electric light fixtures	310,097	329,838
Lamps, lanterns and chandeliers	713,212	919,636
Nickel plated ware, n.o.p.	716,418	761,851
Nickel, nickel silver and German silver in bars, rods, etc.	223,846	229,566
Paints and colors	1,724,222	2,056,085
Electric motors, generators and dynamos	863,128	901,158
Electric insulators, sockets, telephone and telegraph instruments	3,366,861	3,581,912
Gunpowder and other explosives	798,586	982,140
Brass and manufactures of	3,631,589	3,743,897
Copper and manufactures of	4,428,729	4,443,077

A MARKED CONTRAST

Comparison of Canada's import trade with the United States during the fiscal year 1916 and that of 1915 shows some remarkable changes. A year ago there was a decrease of 69.42 per cent under the general classification of "metals, minerals and manufactures of." This year there was an increase of 24½ per cent. Iron and steel and manufactures thereof declined 45 per cent in 1915 and gained 22.39 per cent in 1916. In machinery the loss was 43 per cent in the former year and the gain 32.52 in the latter. In the imports of all merchandise from the United States there was an increase in the last fiscal year of about 20 per cent as compared with a decrease of 44½ per cent in 1915. In an article reviewing Canada's import trade of 1915 with the United States the opinion was expressed by the writer a year ago that 1916 would see a return to more normal conditions. The results show that these expectations have been realized.

A SATISFACTORY OUTLOOK

Trade conditions in Canada to-day are on the whole much more satisfactory than they were a year ago. It is true that the area under crop is not so large by about 15 per cent as it was then, but it is considerably in excess of the average of the two or three years pre-

ceding the abnormal crop year of 1915, while the condition of the crops is on the whole good. The factories of the Dominion are much more busily employed than they were a year ago. This is particularly true of the iron-working plants. The chief difficulty at present is not the getting of orders but the getting of a sufficient supply of both labor and material with which to fill the orders which manufacturers have on their books. A year ago the bank clearings and the railroad earnings were at an unusually low ebb; for some months past they have been exceeding all previous records. Commercial failures, on the other hand, are much smaller than they were a year ago. The bank deposits of the Canadian people are at the highest point on record, being $227,000,000 in excess of a year ago. One thing that can scarcely fail to be of some interest to exporters in the United States is the fact that since the outbreak of the war Canada has borrowed between $250,000,000 and $300,000,000 in New York, whereas her loans on that market had never in any one year previous to the war exceeded $54,000,000. Naturally, large borrowings favor large international trade.

Protest Against Freight Advances in Pig-Iron and Steel Products

WASHINGTON, D. C., Aug. 15, 1916.—C. S. Belsterling representing the United States Steel Corporation, Traffic Manager R. L. Bentley of the Illinois Steel Company and Traffic Manager C. L. Lingo of the Inland Steel Company appeared before the suspension board of the Interstate Commerce Commission on Aug. 14 to protest against advances in transcontinental rates on iron and steel articles proposed in tariffs filed for the transcontinental carriers by R. H. Countiss, their agent.

Five hundred shippers, traffic managers and attorneys told the members of the suspension board that the advances proposed by the carriers were not in accord with the views of the commission expressed in the decision of the formal complaint of the Spokane Merchants' Association. The railroads used that decision as a foundation for making advances, which, as the shippers asserted, had no resemblance whatever to the views of the commission as expressed in that case.

Among the advances against which the shippers protested is that on pig iron from furnaces in Alabama and Tennessee from 45 to 55 cents per 100 lb. The widely published report that the advance was from $9 to $12 per ton is not accurate. Neither in the old nor in the new tariff is there any rate stated in dollars per ton. As stated in THE IRON AGE of Aug. 10 the proposed advance in pig iron is from $10.08 to $12.32 per ton of 2240 lb. and in coke from $9.35 to $11.35 per net ton.

W. L. C.

The Interstate Commerce Commission has found it necessary to direct the carriers to revise freight rates on wrought-iron and other pipe for the purpose of removing certain disadvantages under which manufacturers located in Denver and neighboring territory compete with Eastern producers. The matter has been taken up on the petition of the Vulcan Iron Works Company, the R. Hardesty Mfg. Company and others who produce at Denver many articles from iron bars, steel bars, steel plates, steel sheets and structural steel, among which are riveted and welded pipe, marketed largely in the territory west of Denver. They point out that the current rate of 52.5c. from St. Louis to Denver on Eastern pipe, which is manufactured from different materials but is nevertheless commercially competitive with the Denver pipe, is lower than the proposed rate of 60c. on the raw materials used in making the Denver pipe. The carriers are therefore ordered to raise their St. Louis-Denver rates on pipe to 60c.

The board of directors of the Harrisburg Pipe & Pipe Bending Company, Harrisburg, Pa., has notified holders of all company bonds to present them for payment at the Central Trust Company, Harrisburg, Sept. 30. The company has handled several large orders for munitions for the Allies.

CONTENTS

Iron and Steel Markets

DOMESTIC BUYING FOR 1917

New Shell Steel Orders for 500,000 Tons

Implement Bar Contracts at 2.50 Cents—Pig-Iron Market Takes a Start

The distinct change in the steel market which came with the closing of the first of the large war and other export contracts late in July has now developed into a volume of domestic buying such as has not been seen in weeks. At the same time the buying on war account has swelled to very large proportions. It is now estimated that 3,000,000 large shells are included in the contracts of the past two weeks, and in addition 500,000 tons of shell steel has now been placed by the Allies, two steel companies taking the bulk of this. On the shell business, deliveries run to April 1, 1917, and on the steel blooms, forgings and rounds for the Allied governments, to July 1.

The significance of the foreign preemption of steel capacity in the first half of 1917 has taken hold of some classes of domestic buyers in the past week, particularly buyers of bars, and considerable sales are reported. At Chicago, following the placing of a contract for 170,000 tons of rounds for export, indicating that Steel Corporation mills more favorably located for export were well sold, implement and car works and other users of bars have placed orders for delivery in the first half of 1917 at 2.50c.

It is becoming apparent that in certain finished products the mills will fall considerably short of delivering before Jan. 1 what is scheduled for this year. Appreciation of this fact and of the forehandedness of foreign buyers accounts for the greater stir the week has brought among domestic consumers.

The tightening of the semi-finished steel market has attracted attention in the Pittsburgh district and it develops that a large producer has been a buyer of ingots from a western Pennsylvania plant. Foreign buyers have scoured the Central West for sheet bars with little success. On a 1000-ton lot $50 was quoted.

Ship plate business has figured prominently in eastern Pennsylvania. Sales made and on the point of closing in that district for home and foreign account are over 40,000 tons, including 12,000 tons for Italy. Two Eastern yards have been buyers and a third is in the market. At Chicago 25,000 tons of plates and shapes were sold to a Pacific coast shipyard.

An interesting sale by a Pennsylvania mill is of 15,000 tons of 6-in. channels for France. Of structural steel for home use Chicago reports the taking by a mill in that district of 30,000 tons for car works and 20,000 tons for fabricating purposes. Building contracts run to numerous small tonnages. The Bridge Builders' and Structural Society puts the July orders for the country at but 47.5 per cent of the fabricating capacity.

Tin plate users in fisheries lines are coming much earlier than usual to the mills with their contracts, though shipments will not be made until March. Fruit and vegetable canners are pressing for deliveries to an unusual degree.

In line pipe the leading mills are sold for eight to nine months ahead, and the unfilled oil and gas country orders exceed the last high record made in 1907.

Another indication of the attitude of steel makers is the refusal of a large producer of sheets to enter reservations of automobile companies for delivery in the first half of 1917, though no question was raised as to price. The apportionment of tonnages, in the way familiar six and nine months ago, is thus forecast.

In the pig-iron market there are signs of activity in Buffalo and in Eastern districts, with indications that the buying movement predicted for September is starting in August. Buffalo has made good sales of foundry iron, and in the East inquiries amount to 60,000 tons, including foundry and malleable grades and steel-making iron for export. Concessions on pig iron have been general in recent weeks, but the tone is firmer to-day, and there is some recovery from the special weakness in Southern irons.

A southern Ohio steel maker has bought close to 25,000 tons of basic pig iron for the first half of 1917. A Chicago steel company is inquiring for basic iron and a considerable lot is under negotiation at Buffalo.

There is enough question as to the ability of Lake ore shippers to meet 1916 requirements to cause even now some sounding out of the situation for next year. Some vessel chartering for 1917 at $1, apart from unloading charge, has stirred Cleveland ore circles. An advance in ore is accepted as a certainty. Against $4.45 for old range Bessemer this year, as high as $5.50 has been discussed, ore men arguing that on a $5 basis the vessel owner would get all the increase.

Pittsburgh

PITTSBURGH, PA., Aug. 15, 1916.

With the scarcity of semi-finished material as the outstanding feature in the market, there has been no decided change in the situation. Close figuring on ore supplies and an offered increase of 50c. per ton for all available wild Lake tonnage during the remainder of the season added a little interest to an otherwise quiet but tense feeling as to the future. Refusal of the leading sheet interest to make reservations to automobile manufacturers for next year, irrespective of price, and a prediction that these interests will be apportioned their share of estimated production have injected a little spice into that branch of the trade. Railroad buying is negligible, but there is an extremely heavy demand for ship material. The pig-iron and scrap markets are simply marking time. Conditions in the coke region are improving, and the advent of cooler weather will increase production there as well as in the steel mills, where the excessive heat of the past two weeks has seriously interfered with output.

Pig Iron.—The market seems to be on a dead level, both as to prices and sales. Furnace stocks of steel-making iron are negligible, 9000 tons at one Mahoning Valley furnace being about the only iron not already on

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

Pig Iron, Per Gross Ton:	Aug. 16, 1916.	Aug. 9, 1916.	July 19, 1916.	Aug. 18, 1915.
No. 2 X, Philadelphia...	$19.50	$19.50	$19.75	$15.00
No. 2, Valley furnace....	18.25	18.25	18.25	13.25
No. 2 Southern, Cin'ti...	*16.40*	16.90	16.90	13.90
No. 2, Birmingham, Ala..	*13.50*	14.00	14.00	11.00
No. 2, furnace, Chicago*	18.50	18.50	19.00	13.50
Basic, del'd, eastern Pa..	19.00	19.00	19.00	15.50
Basic, Valley furnace...	18.00	18.00	18.00	14.25
Bessemer, Pittsburgh ...	21.95	21.95	21.95	16.20
Malleable Bess., Ch'go*.	19.00	19.00	19.50	13.50
Gray forge, Pittsburgh..	18.70	18.70	18.70	14.20
L. S. charcoal, Chicago..	19.75	19.75	19.75	16.25
Billets, etc., Per Gross Ton				
Bess. billets, Pittsburgh.	**45.00**	43.00	40.00	23.50
O.-h. billets, Pittsburgh..	45.00	45.00	42.00	24.00
O.-h. sheet bars, P'gh...	**47.00**	45.00	42.00	24.50
Forging billets, base, P'gh.	69.00	69.00	69.00	29 00
O.-h. billets, Phila.....	45.00	45.00	45.00	30.00
Wire rods, Pittsburgh....	55.00	55.00	55.00	27.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill.	1.47½	1.47½	1.47½	1.25
O.-h. rails, heavy, at mill.	1.56½	1.56½	1.56½	1.34
Iron bars, Philadelphia..	2.659	2.659	2.659	1.459
Iron bars, Pittsburgh....	2.60	2.60	2.50	1.30
Iron bars, Chicago.....	2.35	2.35	2.35	1.25
Steel bars, Pittsburgh...	**2.60**	2.50	2.50	1.30
Steel bars, New York...	**2.769**	2.669	2.669	1.469
Tank plates, Pittsburgh.	3.50	3.50	3.50	1.25
Tank plates, New York.	3.669	3.669	3.669	1.469
Beams, etc., Pittsburgh..	2.50	2.50	2.50	1.36
Beams, etc., New York..	2.669	2.669	2.669	1.469
Skelp, grooved steel, P'gh	2.35	2.35	2.35	1.25
Skelp, sheared steel, P'gh	2.45	2.45	2.45	1.30
Steel hoops, Pittsburgh..	**3.00**	2.75	2.75	1.30

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire. Per Lb. to Large Buyers:	Aug. 16, 1916. Cents.	Aug. 9, 1916. Cents.	July 19, 1916. Cents.	Aug. 18, 1915. Cents.
Sheets, black, No. 28, P'gh	2.90	2.90	2.90	1.85
Galv. sheets, No. 28, P'gh.	4.25	4.25	4.25	3.60
Wire nails, Pittsburgh...	2.60	2.60	2.50	1.60
Cut nails, Pittsburgh....	2.60	2.60	2.60	1.60
Fence wire, base, P'gh..	2.55	2.55	2.45	1.40
Barb wire, galv., P'gh...	3.45	3.45	3.35	2.50
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	18.50	18.50	18.50	12.25
Iron rails, Philadelphia..	20.00	20.00	20.00	16.00
Carwheels, Chicago	11.50	11.50	12.00	11.75
Carwheels, Philadelphia..	15.50	15.50	15.00	13.50
Heavy steel scrap, P'gh.	16.00	16.00	16.50	14.00
Heavy steel scrap, Phila..	14.75	14.75	15.00	14.00
Heavy steel scrap, Ch'go.	15.25	15.25	14.00	11.75
No. 1 cast, Pittsburgh...	15.00	15.00	15.75	13.00
No. 1 cast, Philadelphia.	16.00	16.00	16.00	13.50
No. 1 cast, Ch'go (net ton)	11.50	11.50	11.50	9.50
No. 1 RR. wrot, Phila...	**20.00**	19.50	19.50	15.00
No. 1 RR. wrot, Ch'go (net ton)	15.25	15.25	15.00	10.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt...	$2.75	$2.75	$2.75	$1.50
Furnace coke, future....	2.50	2.50	2.50	1.75
Foundry coke, prompt...	3.25	3.25	3.25	2.00
Foundry coke, future...:	3.50	3.50	3.50	2.25
Metals,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.	26.75	26.75	25.25	19.00
Electrolytic copper, N. Y.	26.50	26.50	25.00	16.75
Spelter, St Louis.....	**8.75**	8.12½	9.00	11.50
Spelter, New York.....	**9.00**	8.37½	9.25	11.75
Lead, St. Louis.....	**5.90**	5.75	6.10	4.35
Lead, New York.....	**6.00**	5.95	6.25	4.50
Tin, New York.....	**39.00**	37.67½	37.25	34.50
Antimony, Asiatic, N. Y.	*10.00*	11.00	14.00	33.50
Tin plate, 100-lb. box, P'gh	$6.00	$6.00	$6.00	$3.10

the market, and it has been remarked that ineffective labor or a scarcity of labor in the mills is the reason a stringency in the pig-iron market has not developed. No sales of importance have been reported the past week, although there has been an export inquiry for 30,000 tons of Bessemer iron for France and Italy, also an inquiry for 11,000 tons of basic for delivery over the three months beginning September at Newark, N. J., reported in the market. It develops that the recent purchase of basic iron by a southern Ohio steel manufacturer was 40,000 tons instead of 30,000 tons, as previously reported. The most interesting feature in connection with the pig-iron market during the week has been the fact that some of the large makers of steel-making iron have tried to buy Bessemer ore, and that an advance of 50c. per ton was offered for wild Lake tonnage on all the ore that could be taken between this time and the close of navigation. One buyer trying to get 200,000 tons was offered only 50,000 tons of ore. The inquiry showed that considerable non-Bessemer ore is for sale. We quote Bessemer iron at $21; basic, $18; gray forge, $17.75 to $18; malleable Bessemer, $18.50 to $19, and No. 2 foundry, $18.25 to $18.50, all at Valley furnace, the freight rate to the Pittsburgh and Cleveland districts being 95c. per gross ton.

Ferroalloys.—This market is fairly at a standstill, there being very little inquiry because consumers are well covered for some time ahead. Domestic 80 per cent ferromanganese is quoted at $165 to $175 at furnace. We quote 18 to 22 per cent spiegeleisen at $40 to $45, and 25 to 30 per cent, $55 to $65, at furnace. On 50 per cent ferrosilicon we quote $88 to $89 in lots up to 100 tons; over 100 tons, $87 to $88, and over 600 tons $86 to $87, all per gross ton, f.o.b. Pittsburgh. We quote Bessemer ferrosilicon as follows: 9 per cent, $30; 10 per cent, $31; 11 per cent, $32; 12 per cent, $33; 13 per cent, $34.50; 14 per cent, $36.50; 15 per cent, $38.50, and 16 per cent, $41. Seven per cent silvery is $28.50; 8 per cent, $29; 9 per cent, $29.50; 10 per cent, $30; 11 per cent, $31, and 12 per cent, $32. These prices are f.o.b. furnace, Jackson or New Straitsville, Ohio, or Ashland, Ky., all having a freight rate of $2 per gross ton to Pittsburgh.

Billets and Sheet Bars.—The scarcity of semi-finished steel is more pronounced. Prices are purely nominal, and it is reported that the leading interest some time ago bought all available large lots obtainable within a reasonable radius of Pittsburgh, a good share coming from Eastern mills. A representative of John Lysaght & Co., Newport, Mon., England, has been scouring the country with letters of introduction looking for Bessemer billets or sheet bars, and has offered $47, New York, for any that can be obtained. As far as can be learned, the best proposition offered was by a Cleveland concern for 1000 tons in first quarter at $50, Cleveland. Predictions of a still further scarcity are freely made, and this is largely responsible for the disinclination of finishing mills not amply protected in their supply of raw material to quote for extended delivery. We quote soft open-hearth billets and sheet bars at $47; Bessemer billets, $45 to $47, and Bessemer sheet bars, $45 to $47, maker's mill, Pittsburgh or Youngstown district. We quote forging billets at $69 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 and up to 0.60 carbon take $1 extra.

Structural Material.—No new building projects of importance have been announced. Inquiry for structural material seems to be on industrial plant extension rather than for office buildings or similar commercial enterprises. Among the recent contracts placed are 500 tons for a new power station of the United Gas & Electric Company, Cincinnati, and 2000 tons for extensions to the open-hearth plant of the Brier Hill Steel Company taken by the Lackawanna Bridge Company. Very little railroad work is coming out. We quote beams and channels up to 15 in. at 2.60c. to 2.75c. at mill, for delivery in third and fourth quarters, and from stock 3.10c. for all shapes and 3.50c. for structural plates.

Steel Rails.—The leading interest is filled up until the third quarter of 1917, and little interest is shown in the rail market, as far as standard sections are concerned. There is a fair inquiry and some sales of light

rails are reported. We quote 25 to 45 lb. sections at $47; 16 and 20 lb., $48; 12 and 14 lb., $49, and 8 and 10 lb., $50, in carload lots, f.o.b. at mill, the usual extras being charged for less than carload lots. We quote standard section rails of Bessemer stock at 1.47½c., and of open-hearth, 1.56½c., Pittsburgh.

Plates.—The inquiry for ship and other plates, except car material, is very heavy and specifications against contracts are reported active. We quote ¼-in. and heavier plates for delivery at convenience of the mill at 3c., and for shipment from stock, or during the next two months, at 3.50c. to 4c., f.o.b., Pittsburgh.

Hoops and Bands.—The leading interest announced last week an advance to 3c. on steel hoops, and reports specifications very heavy, with rollings further behind than has been the case for many years. We quote steel hoops at 3c. and steel bands at 2.75c., steel-bar card extras applying on the latter.

Sheets.—The greatest pressure is on the heavier gages, but more demand is developing on the lighter gages in black sheets. Mills have been able to give some attention to the new inquiry for Bessemer stock, but are practically out of the running on open-hearth. The demand for electrical sheets is particularly heavy. It is stated that a more strict application of the rule of apportioning total tonnages to districts and industries will be put into effect next year, because of the anticipated demand being greatly in excess of all probable production. This came out the past week, due to the action of several of the large automobile concerns, who are getting uneasy as to their supply of sheets for next year and have tried to place blanket contracts for their requirements with some of the large interests, the price being left blank and to be determined when books are opened for the first half of 1917. In these cases, the reservations ordered, for that is all it meant, have been returned with the information that certain tonnages will be assigned to the districts in which heavy users are located, and manufacturers will be allotted tonnages pro rata with their requirements from the bulk allowance to that district or industry. This rule is being applied to a limited extent for the last half of this year, but the prediction is made that strict adherence to this rule will apply if present conditions continue through next year. Nominal prices are unchanged. We quote blue annealed sheets, Nos. 9 and 10, at 3c. to 3.25c., for delivery at convenience of the mill. We quote No. 28 Bessemer and open-hearth black sheets at 2.90c. to 3.05c.; No. 28 galvanized, Bessemer and open-hearth, 4.25c. to 4.35c.; Nos. 22 and 24 black plate, tin-mill sizes, H. R. & A., 2.90c.; Nos. 25, 26 and 27, 3c. to 3.10c.; No. 28, 3.10c. to 3.15c., and No. 29, 3.20c. to 3.25c. These prices are for carloads and larger lots, f.o.b., mill, Pittsburgh.

Tin Plate.—The tin-plate situation is now more acute than it has been at any time this year, due primarily to the early ripening of crops and all users are clamoring for more material, quicker deliveries and anticipated shipments. The immediate stress is with fruit and vegetable canners, who are trying to take care of the unusually heavy crops, and also the heavy demand for canned goods in this country and abroad. Added to this, Alaskan fisheries, that usually do not come in the market much before December, and whose shipments to Western points are not imperative before March, have asked mills to enter their orders early in order that they may be sure of their requirements. It is estimated that present orders on the books, with the carry-over, or tin plate which should be delivered by Dec. 31 but cannot be manufactured because of the pressure, will practically keep the mills busy through the first quarter of next year. We quote primes at $6 to the domestic trade, while for export, $6.25 per base box, or higher, is quoted, wasters of suitable sizes often bringing full price. We quote 8-lb. coated ternes at $8.80 for 200 lb. and $9.10 for 214 lb., all f.o.b., Pittsburgh.

Cold-Rolled Strip Steel.—The past two or three days have developed a number of good inquiries for third-quarter delivery. Nothing of importance was closed, however, because of the filled-up condition of the mills. Prices range from $6 to $6.50 per 100 lb. for specifications placed against contracts for delivery prior to Dec. 31. Smaller buyers are paying from $1 to $3 per ton premium for prompt delivery. Shipment at mill convenience means about February of next year. Manufacturers will not open their books for 1917 delivery until October, or until after it becomes known what semi-finished steel prices will be for the first half of next year. The new contract provisions for cold-rolled strip steel are subject to no decline or cancellation, and discounts are computed from net amount of invoice after freight reductions, the practice heretofore having been to take the discount from gross delivered billing. Extras, standard with all the mills, were printed on page 810 of THE IRON AGE of March 30.

Wire Rods.—This market seems to be in a deadlock, with a decided scarcity of rods, it being almost impossible to get them at any price. Most mills rolling rods have a finishing capacity greater than the rod production and are consuming practically all of their own material. We quote soft Bessemer, open-hearth and chain rods at $55 to $60 per ton, f.o.b. Pittsburgh.

Wire Products.—An increase in specifications is noted, but mills are only taking on such new contracts as are absolutely forced upon them, and in this jobbers are only being taken on for 60 days and manufacturers for the third and fourth quarters. Books have not been opened for next year's business, and mills are confining sales to old established domestic connections. Foreign inquiry has been unusually heavy and as high as $3.70, base, has been quoted on nails and annealed wire for foreign shipment. We quote $3.60, base, on nails; $2.55 on fence wire to jobbers and $2.65 to manufacturers, with an extra of 70c. on galvanizing Nos. 6 to 14, $1.05 for Nos. 15 to 16 and $1.45 for Nos. 17 to 18.

Iron and Steel Bars.—Aside from the heavy demand for large rounds for munition stocks, there has been no change in the bar situation, but the recent advance of $2 per ton has had the effect of steadying the market. A new producer of merchant iron bars, the Roanoke Steel Company, Inc., Roanoke, Va., will be in the market as a seller in about ten days. We quote steel bars at 2.60c. for delivery at convenience of the mill, and small rounds from stock at 3.10c., and for large rounds, 2-in. and over, from stock at 3.75c. We quote refined iron bars at 2.60c., and railroad test bars, 2.70c. to 2.80c. at mill.

Shafting.—This market is as firm as ever and the going quotation of 20 per cent to 15 per cent off is purely nominal and governs future business, which none of the mills is anxious to consider. The demand is more insistent than heavy, buyers being fairly well covered by contracts, but unable to get the material, this being reflected back to the serious situation confronting the mills in getting their supplies of raw material. There is no change in nominal prices, but shafting manufacturers are not inclined to accept new business except at premium prices, which for reasonably prompt delivery run from list to 10 per cent off. We quote cold-rolled shafting at 20 to 15 per cent off in carload lots for delivery in last quarter of this year and first quarter of 1917, and 10 per cent off in less than carload lots, f.o.b. Pittsburgh, freight added to point of delivery.

Merchant Steel.—Conditions continue as they have been for several weeks. Prices on small lots are about as follows: Iron-finished tire, ½ x 1½ in. and larger, 2.50c., base; under ½ x 1½ in., 2.60c.; planished tire, 2.70c.; channel tire, ¾ to ⅞ and 1 in., 2.85c. to 2.95c.; 1⅛ in. and larger, 3.25c.; toe calk, 2.95c. to 3.05c., base; flat sleigh shoe, 2.70c.; concave and convex, 2.75c.; cutter shoe, tapered or bent, 3.25c. to 3.35c.; spring steel, 2.95c. to 3.05c.; machinery steel, smooth finished, 2.75c.

Nuts and Bolts.—The July and August slackening, which this year was not nearly so noticeable as in former years, is apparently over and the demand for material is getting stronger. Manufacturers are trying to take care of current needs of customers by shipping in small lots on contracts and carload shipments are the exception, rather than the rule. Prices are unchanged but firm, and it is reported that nearly as much inquiry is rejected as manufacturers are turning into orders. Discounts in effect from May 19 are as fol-

lows, delivered in lots of 300 lb. or more, where the actual freight rate does not exceed 20c. per 100 lb., terms 30 days net, or 1 per cent for cash in 10 days:

Carriage bolts, small, rolled thread, 50 and 10 per cent; small, cut thread, 50; large, 40.

Machine bolts, h. p. nuts, small, rolled thread, 50, 10 and 5 per cent; small, cut thread, 50 and 5; large, 40 and 10.

Machine bolts, c. p. c. and t. nuts, small, 40, 10 and 5 per cent; large, 35 and 5. Blank bolts, 40 and 10 per cent; bolt ends with h. p. nuts, 40 and 10; with c. p. nuts, 35 and 5. Rough head bolts, 15. Lag screws (cone or gimlet point), 50 and 10.

Forged set screws and tap bolts, 10 per cent. Cup and round point set screws, case hardened, 60. Square and hexagon head cap screws, 55. Flat, button, round or fillister head cap screws, 30.

Nuts: h. p. sq., tapped or blank, $2.90 off list; hex., $2.90 off; c. p. c. and t. sq. tapped or blank, $2.60 off; hex., $3 off; semi-finished hex., 60 and 10 per cent; finished and case hardened, 60 and 10.

Rivets, 7/16 in. in diameter and smaller, 45, 10 and 10 per cent.

Railroad Spikes.—No new inquiries of importance have come out, and the week has been uneventful. Consumers are well covered by contracts for some time ahead. Regular prices are as follows:

Standard railroad spikes, 4½ x 9/16 in. and larger, $2.65 to $2.75; railroad spikes, ½ and 7/16 in., $2.75 base; railroad spikes, ⅜ in. and 5/16 in., $3.05 base; boat spikes, $2.80 base, all per 100 lb., f.o.b. Pittsburgh.

Rivets.—Manufacturers are finding it harder every week to get bar material, and pressure for deliveries continues strong. Several important inquiries, two of them for fairly large tonnages, are in the market this week, for delivery before November. Makers' prices are unchanged, as follows: Buttonhead structural rivets, ½ in. in diameter and larger, $4 per 100 lb., base, and conehead boiler rivets, same sizes, $4.10 per 100 lb., base f.o.b. Pittsburgh. Terms are 30 days net, or one-half of 1 per cent for cash in 10 days.

Wrought Pipe.—The strength of the line pipe and oil and gas country situation is summarized briefly and to the point by showing that, in spite of the fact that oil prices in the mid-West territory have declined about 30 per cent within the past two weeks, there has been no cancellation or suspension of orders, both of which might be expected had operators any doubt as to the future. Mills are practically filled to capacity on this class of pipe for the next eight or nine months, and the amount booked is greater than at any previous time in the history of the industry. The only productive capacity not filled to the extent mentioned is on butt-weld sizes of merchant pipe, 3½ in. and smaller, but it would take only from 30 to 60 days' active buying and a little impetus in building operations to put the smaller pipe on a very extended delivery basis. The marked decline in spelter prices and an inclination to wait for the bottom of the market have held off some buying by jobbers, but the fall buying movement is in evidence. Discounts on black and galvanized iron and steel pipe are given on another page.

Boiler Tubes.—Conditions in this market have not changed materially for several weeks. There is a continued heavy demand, with a large volume of inquiry and heavy specifications against old contracts. Discounts on iron and steel boiler tubes are firmly held as given on another page.

Coke.—The spot coke market is stronger and there is an active demand. With the cooler weather of the past week it is believed that the production of coke in the Connellsville region will greatly improve, and conditions are getting better, with the outlook that the coke situation will be a little easier in a week or ten days. The Koppers by-product coke plant of the Youngstown Sheet & Tube Company will start next week. We quote furnace coke for prompt shipment at $2.50 to $2.75, and on contracts over the remainder of the year from $2.35 to $2.50, depending on the quality. We quote best grades of 72-hr. foundry coke for prompt shipment at $3 to $3.25, and on contracts $3.25 to $3.50 per net ton at oven. The Connellsville *Courier* reports the output of coke in the upper and lower Connellsville regions for the week ended Aug. 5 as 394,200 net tons, a decrease over the previous week of 22,855 tons.

Old Material.—The scrap market continues inactive, but prices are holding very well, considering the absence of all movement in either direction, buying or selling, and practically nothing is being forced for sale. Prices quoted by dealers for delivery in Pittsburgh and nearby districts that take the same rates of freight, per gross ton, are as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh, delivered	$16.00 to $16.50
No. 1 foundry cast	15.00 to 15.25
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	16.25 to 16.50
Hydraulic compressed sheet scrap	13.50 to 13.75
Bundled sheet scrap, sides and ends, f.o.b. consumers' mills, Pittsburgh district	11.25 to 11.50
Bundled sheet stamping scrap	10.75 to 11.00
No. 1 railroad malleable stock	13.50 to 14.00
Railroad grate bars	9.00 to 9.25
Low phosphorus melting stock	19.50 to 20.00
Iron car axles	27.00 to 27.50
Steel car axles	27.00 to 27.50
Locomotive axles, steel	28.00 to 28.50
No. 1 busheling scrap	13.00 to 13.25
Machine-shop turnings	8.00 to 8.25
Old carwheels	13.00 to 13.25
Cast-iron borings	8.00 to 8.25
*Sheet bar crop ends	16.50 to 17.00
No. 1 railroad wrought scrap	17.50 to 18.00
Heavy steel axle turnings	11.00 to 11.25
Heavy breakable cast scrap	12.50 to 12.75

*Shipping point.

Chicago

CHICAGO, ILL., Aug. 16, 1916.—(*By Wire.*)

Yielding up their stubborn hope of lower prices for the first half when confronted with an actual advance and the accumulated evidence of heavy foreign buying, domestic steel users generally have been covering for their first half needs. The implement trade (including the largest interests), fabricators, car builders and railroad supply manufacturers have participated, as well as a large proportion of the consumers in miscellaneous lines. Inquiry running into a large aggregate remains to be considered. While this activity has been widespread, the high prices and irrevocable nature of the contracts insisted upon by most of the mills have limited purchases to conservatively estimated tonnages and have left little inducement to speculation such as featured the buying of last spring. In a number of instances inquiry has brought out refusals to quote or a radical paring down of the amount of steel desired. Some of the mills jumped their prices sharply to 2.60 and 3c., Pittsburgh, and have taken business at the advance, but for the most part regular customers were given opportunity to cover at 2.50c. Illustrative of the character of recent extra-territory bookings that have contributed to the commanding position of the mills are 170,000 tons of shell steel, 25,000 tons for Pacific coast shipbuilding and 6000 tons additional of rails for Russia. These and other like purchases are binding as to quantity and price. Local buying includes 30,000 tons of car shapes, a like amount of structural steel for fabrication, numerous contracts for tank plates in quantity up to 2000 tons and a general round-up of bar tonnage. New producing capacity in this territory will afford but little relief in the last half. At Gary a possible 40,000 tons will be added to production in the last quarter, enhanced perhaps by some duplex steel from the South works, while at Indiana Harbor inability to complete new rolling-mill capacity this year will leave the 30,000 tons increase in steel production to be disposed of as ingots if at all. Pig-iron sales have been too few to test prices fully, but inquiry, increasing somewhat in quantity, bids fair, if it is closed, to bring about an adjustment of the existing wide spread between Northern and Southern quotations. An important user of basic is in the market.

(By Mail)

Pig Iron.—The market is improving as to the amount of inquiry but sales are slow in closing. A local steel maker is in the market for basic iron, and unless Northern furnaces withdraw from their position long held at $19, the Southern quotation of $14, Birmingham, will be low by more than $1 per ton. A like situation obtains in respect of the inquiry of the Milwaukee Railroad for 500 tons of foundry iron, silicon 2.75 to 3.25

per cent, which is still open, but as $18.50 has already been quoted on other business by at least one Northern interest, it seems likely that the desire to secure business normally belonging to Northern producers will prevail over the matter of price. A Milwaukee stove manufacturer is in the market for 500 tons of malleable and 200 tons of silvery iron. Other smaller inquiries of 200 and 300 tons are reported. Sales of spiegeleisen in this market last week included one of 1000 tons. Much iron is being held up because of the curtailment of foundry operations resulting from labor shortage or strikes. There is some improvement in the situation at Chicago, but at Milwaukee there is little or no progress. Users of malleable castings are especially hard pressed, so far has production fallen behind. For Lake Superior charcoal iron we quote delivery prices at Chicago to include a freight rate of $1.75. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5	$19.75
Lake Superior charcoal, No. 1	20.25
Lake Superior charcoal, No. 6 and Scotch	20.75
Northern coke foundry, No. 1	$19.00 to 19.50
Northern coke foundry, No. 2	18.50 to 19.00
Northern coke foundry, No. 3	18.00 to 18.50
Southern coke, No. 1 f'dry and 1 soft	18.00 to 18.50
Southern coke, No. 2 f'dry and 2 soft	17.50 to 18.00
Malleable Bessemer	19.00
Basic	19.00 to 19.50
Low phosphorus	34.00
Silvery, 8 per cent	29.50
Bessemer ferrosilicon, 10 per cent	32.50

Rails and Track Supplies.—The Russian Government has bought an additional 6000 tons of rails which will, it is understood, be rolled from open-hearth steel at Chicago. There is little other new business coming out in track material and it is unquestionably fortunate in view of the condition of the mills. Quotations are as follows: Standard railroad spikes, 2.75c., base; track bolts with square nuts, 3.25c. to 3.50c., base, all in carload lots, Chicago; tie-plates, $50, f.o.b. mill, net ton; standard section, Bessemer rails, Chicago, $33, base; open-hearth, $35; light rails, 25 to 45 lb., $40; 16 to 20 lb., $41; 12 lb., $42; 8 lb., $43; angle bars, 2c., Chicago.

Structural Material.—The movement on the part of steel users to get under cover at 2.50c., Pittsburgh, following the announcement of the advance of $2 per ton, included many fabricators and a number of carbuilders. Reports of 20,000 tons of miscellaneous business and 30,000 tons of car steel taken by one mill are evidences of the activity. Other mills advanced their price to 2.60c. at once and some little business has been taken on that basis. Car buying included the placing by the New York Central Lines of 1000 cars, the second 1000 remaining open; 1000 cars bought quietly by another road, 500 refrigerator cars for the Illinois Central and a like number for the Soo Line. The German-American Car Company, East Chicago, has taken 200 tank cars, while several lots of cars are reported placed at Western shops for repair. Contracting for fabricated steel continues to be marked by the large number of small jobs. With the exception of 400 tons for further plant extensions at Gary and 720 tons also taken by the American Bridge Company for sugar factories in Idaho contracts reported were for comparatively small amounts. The Fort Pitt Bridge Works will furnish 200 tons for the Milwaukee Railroad and the Wisconsin Bridge & Iron Company, 150 tons. The Morava Construction Company took 230 tons for the National Malleable Castings Company's plant extension and the Rochester Bridge Company, 160 tons for a new steel foundry at Benton Harbor, Mich. We quote for Chicago delivery of plain material from mill 2.789c.

We quote for Chicago delivery of structural steel from jobbers' stocks 3.10c.

Plates.—Various sales of tank plates by local mills to regular trade for delivery in the last and first quarters, one transaction involving as much as 2000 tons, on the basis of 3c., Pittsburgh, have definitely established the market at the new price level. The increased interest in normal lines continued secondary, however, to the inflow of special business. One order for 25,000 tons of plates and shapes for Pacific coast shipbuilding is noted. For prompt shipment plates, quotations are again tending upward, and 3.50c., Pittsburgh, for ordinary widths is now the general minimum where delivery is required within 30 days. We quote for Chicago delivery of plates from mill at its convenience 3.189c. For prompt shipment we quote 3.689c. to 4.189c.

We quote for Chicago delivery of plates out of jobbers' stocks, 3.50c.

Sheets.—The resumption of domestic buying in the heavier steel lines carried with it a revival of interest in sheets, although no changes in prices were directly involved. Quotations for black sheets are generally firmer, except as applied to roofing sheets, where quality is less rigidly adhered to. For the latter, prices as low as 2.75c., Pittsburgh, are still current on No. 28, as against a minimum of 2.85c. for standard one-pass sheets. Inquiry for blue annealed and galvanized sheets has likewise increased. We quote for Chicago delivery, blue annealed, No. 16 and heavier, 3.089c. to 3.339c.; box annealed, No. 17 and lighter, 2.939c. to 3.039c.; No. 28 galvanized, 4.289c. to 4.389c.

We quote for Chicago delivery of sheets out of stock, minimum prices applying on bundles of 25 or more, as follows: No. 10 blue annealed, 3.40c.; No. 28 black, 3.10c. to 3.20c.; No. 28 galvanized, 5c. to 5.10c.

Bars.—The impressive quantities of steel in bar form booked in the last few days for rolling in this district for export are an unmistakable indication of the well-sold condition of mills more favorably located for export, and will go far toward establishing the position of local mills for the first half. The placing of one contract for 170,000 tons is noted. This and other sales are irrevocable, and not subject to revision in price. In addition to this foreign business, which is generally in excess of expectations, domestic consumers, including the leading implement interests, have been contracting for the first half at 2.50c. Individual companies did not buy heavily as a rule, but the mills again adhered closely to their regular trade, and, as earlier in the year, consumers who have dealt with mills now oversold have been allotted as little as one-half of the steel desired. Implement interests which bought mild steel last week did not buy rail-carbon steel at the same time, apparently continuing the policy of postponing such purchases until the strength of the market has been fully tested. Miscellaneous inquiry for rerolled steel is good, as is the inquiry for bar iron. We quote mill shipment, Chicago, as follows: Bar iron, 2.35c.; soft steel bars, 2.789c.; hard steel bars, 2.50c.; shafting, in carloads, 25 per cent off; less than carloads, 20 per cent off.

We quote store prices for Chicago delivery: Soft steel bars, 3.10c.; bar iron, 3.10c.; reinforcing bars, 3.10c. base with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 10 per cent off.

Rivets and Bolts.—The recent period of extreme quiet in the bolt and nut trade, with its occasional campaign for business by individual manufacturers on the strength of a concession in price, is being followed by a resumption of interest on the part of a number of buyers. Where the placing of contracts has been delayed there is now inquiry, with a disposition to cover for a considerable period in the future. There still remains, however, a considerable diversity in the attitude of various sellers and quotations are marked with irregularity, depending on the business in question. We quote carriage bolts up to ⅜ x 6 in., rolled thread, 50-10-5; cut thread, 50-5; larger sizes, 40-5; machine bolts up to ⅜ x 4 in., rolled thread, with hot pressed square nuts, 50-10-10; cut thread, 50-10; larger sizes, 40-10-5; gimlet-point coach screws, 60; hot pressed nuts, square, $2.90 off per 100 lb.; hexagon, $2.90 off. Structural rivets, ¾ to 1¼ in., 4c. to 4.15c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 3.75c.; boiler rivets, 3.85c.; machine bolts up to ¾ x 4 in., 60-10; larger sizes, 50-10; carriage bolts up to ¾ x 6 in., 60-5; larger sizes, 50 off; hot pressed nuts, square, $3.25, and hexagon, $3.25 off per 100 lb.; lag screws, 65.

Wire Products.—The wire trade is beginning to move upward from the low point, in volume of business.

While fencing shows little improvement, the demand for plain wire and nails is distinctly heavier. The advance in prices seems to have had little effect other than to accentuate the policy of retail dealers to buy only from hand to mouth. We quote as follows per 100 lbs: Plain wire, Nos. 6 to 9, base, $2.839; wire nails, $2.789; painted barb wire, $2.939; galvanized barb wire, $3.639; polished staples, $2.939; galvanized staples, $3.639; all Chicago.

Cast-Iron Pipe.—The city of Chicago is in the market for about 950 tons of pipe, the awarding of which is scheduled for to-day. Other lettings for the current week include 500 tons for Ravenna, Ohio, and a like amount for Toledo, Ohio. The leading interest will get the order for 300 tons for Lincoln, Neb. Several additional lots of pipe of small quantity are also pending. We quote as follows, per net ton, Chicago: Water pipe, 4-in., $33.50 to $34; 6-in. and larger, $30.50 to $31, with $1 extra for class A water pipe and gas pipe.

Old Material.—Such strength as the market is able to show is largely of a negative character, in that it arises out of the apparent indifference of the selling interests in offering their scrap for sale. While there has been no new buying by the larger consumers since the orders for steel scrap for delivery at Gary and Indiana Harbor were placed, the dealers and brokers who participated in that selling are finding the filling of those orders a slow process. Prices are therefore showing some tendency upward. All of the influences ordinarily bearing upon the market appear to be alike in their contribution to a quiet situation. Current railroad offerings of scrap are negligible. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	$18.50 to $19.00
Relaying rails	19.50 to 20.50
Old carwheels	11.50 to 12.00
Old steel rails, rerolling	15.75 to 16.00
Old steel rails, less than 3 ft	15.75 to 16.00
Heavy melting steel scrap	15.25 to 15.50
Frogs, switching and guards, cut apart	15.25 to 15.50
Shoveling steel	14.75 to 15.00
Steel axle turnings	9.25 to 9.75

Per Net Ton

Iron angles and splice bars	$18.75 to $19.00
Iron arch bars and transoms	19.50 to 20.00
Steel angle bars	13.75 to 14.25
Iron car axles	25.50 to 26.00
Steel car axles	28.00 to 28.50
No. 1 railroad wrought	15.25 to 15.75
No. 2 railroad wrought	14.50 to 14.75
Cut forge	14.00 to 14.75
Pipes and flues	11.00 to 11.25
No. 1 busheling	12.25 to 12.75
No. 2 busheling	8.75 to 9.25
Steel knuckles and couplers	14.00 to 14.50
Steel springs	14.50 to 15.00
No. 1 boilers, cut to sheets and rings	10.25 to 10.75
Boiler punchings	13.75 to 14.25
Locomotive tires, smooth	20.00 to 20.50
Machine-shop turnings	5.50 to 6.00
Cast borings	6.00 to 6.50
No. 1 cast scrap	11.50 to 12.00
Stove plate and light cast scrap	9.25 to 9.75
Grate bars	10.00 to 10.25
Brake shoes	9.75 to 10.25
Railroad malleable	11.25 to 11.75
Agricultural malleable	10.75 to 11.25

Philadelphia

PHILADELPHIA, PA., Aug. 15, 1916.

The placing of extremely large contracts for steel to be used in the manufacture of war munitions at home and abroad is impressive. The eastern Pennsylvania mills are sharing in this business to the full extent of capacity available for rolling during the first quarter and the first half of 1917. In the last few days orders for about 150,000 tons of shell steel have been accepted. Heavy contracts for ship plates also have been closed on domestic and foreign account for delivery in six to nine months; sales made and now on the point of closing aggregate between 40,000 and 50,000 tons. An Eastern mill also has accepted an order for 15,000 tons of structural shapes for export to France. A stronger tone prevails for all semi-finished and fully finished forms of steel. One result of the heavy buying is to awaken greater interest among some domestic consumers who two weeks ago were inclined to retire from the market.

Pig Iron.—Several large domestic consumers of foundry iron came into the market last week with inquiries for upward of 20,000 tons for forward shipment. There were also more numerous sales of small lots of foundry grades, running from 50 to 250 tons each and aggregating about 6000 tons, mainly for prompt shipment; but while there was an increased tonnage sold there was no improvement in the prices realized. It may be significant, however, that blast-furnace interests are encouraged to anticipate some appreciation in prices in the near future. On the other hand, the market is still handicapped by the offering of resale lots and until these are eliminated an upward movement is likely to be delayed. The largest single purchase of foundry iron—about 2000 tons—was made by a local pipe works, including 500 to 1000 tons of No. 2 plain Virginia metal and some low-grade high-sulphur iron, for early delivery. In fact, it is an interesting point that practically all of the purchases of small lots were for prompt shipment, indicating that not a few consumers find that their stock piles are running down. A few small lot sales—100 to 200 tons—of foundry iron were made for export via Baltimore. Steel-making iron was also more active, with one inquiry for 11,000 tons of basic from a Newark, N. J., consumer for shipment at the rate of 2000 tons per month, to begin at once. The market remains steady from the furnace standpoint; in fact, in the face of the recent dullness, prices have been exceptionally well sustained. A resale of 6000 tons of warrant Valley basic at $17.75 furnace, by a Philadelphia speculator, cannot be regarded as having a direct bearing upon eastern Pennsylvania basic, which is now more firmly held at $19 to $19.50 delivered. Export business, present and prospective, is exciting more interest. One lot of 5000 tons of special Bessemer was sold for direct shipment to France, and an inquiry is out for 30,000 tons of Bessemer for the French Government. Italy asks for prices on 10,000 tons of low phosphorus, France wants to buy 2000 tons and Japan needs 3000 tons more. There are also foreign inquiries for 1000 tons and for 1500 tons of special Bessemer iron. The recent sudden advance of $7 to $8 per ton in ocean freight rates militates against the prompt closing of export business. In a few instances special freight rates of $1 to $3 per ton higher than was paid on recent shipments were offered for 2000-ton lots for shipment to French and Italian ports. To-day there was an offer of $30 per ton (against $28 a few weeks ago) to carry 1000 tons of pig iron from New Orleans to Genoa, on a ship to sail Aug. 21. The open rate, however, is $35 per ton or higher. Apparently foreign consuming interests do not fully understand the freight situation, as cables from abroad received yesterday inquired why delivered prices on pig iron are so much higher than 10 days ago. Quotations for standard brands, delivered in buyers' yards, prompt shipment, range about as follows:

Eastern Pa., No. 2 X foundry	$19.50 to $20.25
Eastern Pa., No. 2 plain	19.25 to 20.00
Virginia No. 2 X foundry	20.25 to 21.25
Virginia, No. 2 plain	20.00 to 20.75
Gray forge	18.50 to 19.00
Basic	19.00
Standard low phosphorus	34.00

Iron Ore.—Arrivals of foreign ore at this port during the week ended Aug. 12 included 6111 tons, valued at $31,288, from Sweden and 12,600 tons, valued at $47,883, from Cuba.

Billets.—The demand for billets and other semi-finished forms is more pressing. One large interest, with several blooming mills and another about to go into commission, is anxiously seeking outside blooming capacity. Some Bessemer billets are offered at $45 to $50, Pittsburgh base, and several lots of a few thousand tons of open-hearth steel billets are offered by outside interests.

Ferroalloys.—A little better inquiry for ferromanganese is reported from consumers in the interior but otherwise the market remains quiet and a somewhat easier tone prevails for either domestic or foreign at $170 and $175 per ton, seaboard, and probably further concessions of $5 per ton would be made to effect sales. It is notable, however, that there is some uneasiness because of the failure to make shipments from England against contracts thus far this month. Cables just

received attribute the delay to the withholding of licenses. Another inquiry is reported from Italy. Imports at this port last week were 678 tons, valued at $81,743, from England. Spiegeleisen remains steady at $50, furnace. A better demand for ferrosilicon is evident but mainly for blast-furnace grades. One domestic consumer asks for prices on 2000 tons of 10 per cent for 1917 shipment and another large export inquiry, for 10 to 13 per cent, comes from Japan. Fifty per cent ferrosilicon is strong at $86 to $88 and 11 per cent at $31, Pittsburgh.

Plates.—Shipbuilders on the Atlantic seaboard have placed contracts for 20,000 tons of marine plates, 12,000 tons has been sold for export and 10,000 to 15,000 tons more is under negotiation for domestic and foreign shipment. The Pennsylvania Shipbuilding Company., Gloucester, N. J., is understood to have placed 12,000 tons for five boats with Pittsburgh interests at 3 to 3¼c. per lb., Pittsburgh base for shipment in the second quarter of 1917. The Standard Shipbuilding Company has ordered forgings for five boats, of 5000 to 8000 tons burden, and is also reported to have contracted for 8000 to 10,000 tons of plates. The Sun Shipbuilding Company is on the point of closing for 8000 tons of plates for four tank boats of 10,000 tons each, for delivery over the first quarter of 1917. Two eastern Pennsylvania mills have sold 12,000 tons of plates for export to Italy; one taking 8000 tons and the other 4000 tons at 3¼c. to 3½c. per lb., Pittsburgh base, for shipment in the next six months. Another lot of several thousand tons is reported to have been sold for export to Japan. Two other Eastern mills are holding firmly at 4c., Pittsburgh, and will not promise deliveries under eight to nine months. One mill is still able to make deliveries of universal plates in six to eight weeks.

Bars.—Large contracts for shell bars have been taken for domestic shipment and for export, one eastern Pennsylvania seller being credited with booking orders for upward of 100,000 tons, including 26,000 tons of 6⅜ in. for the Baldwin Locomotive Works, but the largest tonnage was for foreign shipment. The Baldwin interests also are said to have bought 3500 tons of 5⅛-in. rounds. The American Locomotive Company is reported to have ordered 70,000 tons of shell bars from two Pittsburgh mills. A Southern manufacturer of war munitions has bought 12,000 tons of 6⅜-in. bars against an inquiry for 35,000 tons. Structural bars are wanted most urgently in small lots up to 1000 tons for shipment in the next four to six months but bar mills are avoiding orders whenever possible. The nominal price asked is 2.759c., Philadelphia, but some makers ask and obtain 2.909 to 3.59c. Iron bars are in better demand and stronger. The principal demand is from the railroads at 2.659c., Philadelphia.

Structural Material.—J. P. Morgan & Co. have placed a contract for 15,000 tons of plain shapes for export to France, with an eastern Pennsylvania mill, and other foreign business is pending. Steel building work is quiet. The Philadelphia Electric Company, after taking bids on 300 tons of fabricated steel for a building at Tenth and Chestnut Streets, is holding the award in abeyance. The proposed Franklin Trust Company's eight-story building on Fifteenth Street requires 675 to 700 tons of shapes, but the bids submitted are deemed too high to encourage construction now. The Pennsylvania Railroad has placed some small orders for bridges and for a coal trestle calling for about 1200 tons of shapes, and is taking bids on 100 tons for a freight shelter at Connellsville. The Southern Railroad bridge contracts, 7000 tons, are still pending. Prices on plain material continue to range from 2.909 to 3.159c., Philadelphia. The Lackawanna Steel Company has sold 300 to 400 tons of sheet piling for early delivery from stock.

Sheets.—Automobile manufacturers have placed several orders for blue-annealed sheets, one for a substantial tonnage. Prices range from 3.159c. to 3.659c., Philadelphia, for No. 10, according to delivery.

Coke.—The market is steady, with fair sales of foundry coke. Low-grade heating coke sells at $2.50 per net ton at oven. Foundry is held at $2.75 for spot and $2.50 for contract per net ton at oven. Freight rates from the principal producing districts are as follows: Connellsville, $2.05; Latrobe, $1.85, and Mountain, $1.65.

Old Material.—The new features of interest the past week were cable inquiries from Italy for 10,000 tons of old rails and the usual monthly railroad scrap offerings. The Pennsylvania, Baltimore & Ohio, and Philadelphia & Reading have each made awards of various items aggregating 10 000 tons, 7000 tons and 2000 tons respectively. The New Haven, the Southern, the Seaboard Air Line and the Norfolk & Western will make awards in the next few days. The railroad embargoes against shipment to the Coatesville plants is still rigidly maintained. Embargoes also have been placed against several mills in the Pittsburgh territory. There have been several sales of car axles, in lots of 100 to 300 tons. Railroad wrought is firmer and is held 50c. per ton higher, while borings and turnings are 50c. per ton lower. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania, and taking freight rates from 35c. to $1.35 per gross ton, are as follows:

No. 1 heavy melting steel	$14.75 to $15.25
Old steel rails, rerolling	17.00 to 18.00
Low phos. heavy melting steel scrap	20.50 to 21.50
Old steel axles (nominal)	30.00 to 31.00
Old iron axles (nominal)	28.00 to 29.00
Old iron rails	20.00 to 20.50
Old carwheels	15.50 to 16.00
No. 1 railroad wrought	20.00 to 21.00
Wrought-iron pipe	12.50 to 13.00
No. 1 forge fire	12.50 to 13.00
Bundled sheets	12.50 to 13.00
No. 2 busheling	10.50 to 11.00
Machine-shop turnings	8.00 to 8.50
Cast borings	9.50 to 10.00
No. 1 cast	16.00 to 16.50
Grate bars, railroad	11.75 to 12.25
Stove plate	11.75 to 12.25
Railroad malleable	13.50 to 14.00

Cincinnati

CINCINNATI, OHIO, Aug. 16, 1916.—(*By Wire.*)

Pig Iron.—Sentimentally, the situation has improved considerably but foundry-iron purchases here have been lately confined to small tonnages urgently needed by a few consumers. The melt of foundry iron is on the increase, however, and shipments are going forward on old contracts at a much better rate. Southern foundry iron continues to be a very strong competitor in this market, and $13.50, Birmingham basis, can be done for some furnace iron for shipment this year, although the majority of furnaces are firm at $14 to $15. Few open inquiries are out, the largest of which is from St. Louis territory for 1500 tons for the last half. It is rumored that a large consumer of basic in this territory has covered for first half requirements. An inquiry from another basic user is also pending. Southern Ohio furnaces have not been entirely successful in resisting pressure from other markets, and $18.50, Ironton, can be done on No. 2 foundry and basic for nearby shipment, while on desirable business it is alleged that this price could be shaded on basic and malleable and probably on foundry iron. A second inquiry has been received from a prominent pump manufacturer for approximately 16,000 tons of foundry iron for delivery to its different plants in the last half of 1917. The furnaces are not disposed to quote for delivery that far ahead. Northern silvery irons are a trifle firmer at $27, furnace, for an 8 per cent analysis, but Southern silvery is unchanged at $24, Birmingham basis. Based on freight rates of $2.90 from Birmingham and $1.26 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	$16.90 to $18.40
Southern coke, No. 2 f'dry and 2 soft	16.40 to 17.90
Southern coke, No. 3 foundry	15.90 to 17.40
Southern coke, No. 4 foundry	15.40 to 16.90
Southern gray forge	14.90 to 16.40
Ohio silvery, 8 per cent silicon	28.26 to 28.76
Southern Ohio coke, No. 1	20.76 to 21.26
Southern Ohio coke, No. 2	19.76 to 20.26
Southern Ohio coke, No. 3	19.26 to 19.76
Southern Ohio malleable Bessemer	19.76 to 20.26
Basic, Northern	19.76 to 20.26
Lake Superior charcoal	21.20 to 22.20
Standard Southern carwheel	24.90 to 25.40

(By Mail)

Finished Material.—Galvanized sheets have recovered some of the lost ground and are firmer this

week. Nearby mills are quoting No. 28 at 4.50c. to 4.60c. Cincinnati or Newport, Ky., and No. 28 black sheets around 3c. to 3.10c. The local warehouse price on No. 28 galvanized sheets is unchanged at 5.15c. An improvement in business is noted all along the line with one exception and the demand for building materials is especially on a big increase. We quote from local stocks as follows: Steel bars and small structural shapes, 3.20c.; twisted steel bars, 3.35c.; plates, 3.50c.; wire nails, $2.75 per keg, base; barb wire, $3.60 per 100 lb., and No. 10 blue annealed sheets 3.50c. Railroad track material is very dull, and in fact all railroad buying is very slow.

Coke.—The consumption of foundry coke is on the increase, but no new contracts are reported. A few sales have been made of carload lots to fill in, but these are not of sufficient volume to affect the market. Furnace coke is slightly firmer for prompt shipment, but no recent sales have been made in this territory. We quote Connellsville 48-hr. coke at $2.50 to $2.75 per net ton at oven, and 72-hr. foundry coke at $3.15 to $3.50. Wise County and Pocahontas foundry coke quotations range from $3.25 to $3.75, and New River brands at $3.75 to $4.25.

Old Material.—Iron axles have been advanced again and the minimum selling price to-day is around $23 to $24 per net ton. No. 1 railroad wrought is also a little stronger and is quoted around $13.50. Bundled sheet scrap, cast borings and steel turnings are weak. The following are dealers' prices to consumers, f.o.b. at yards, southern Ohio and Cincinnati:

Per Gross Ton

Bundled sheet scrap	$10.25 to $10.75
Old iron rails	15.50 to 16.00
Relaying rails, 50 lb. and up	21.00 to 21.50
Rerolling steel rails	14.50 to 15.00
Heavy melting steel scrap	14.00 to 14.50
Steel rails for melting	13.00 to 13.50

Per Net Ton

No. 1 railroad wrought	$13.50 to $14.00
Cast borings	4.50 to 5.00
Steel turnings	4.75 to 5.25
Railroad cast scrap	11.00 to 11.50
No. 1 machinery cast scrap	12.75 to 13.25
Burnt scrap	8.25 to 8.75
Iron axles	23.00 to 24.00
Locomotive tires (smooth inside)	19.75 to 20.25
Pipes and flues	9.25 to 9.75
Malleable and steel scrap	10.75 to 11.25
Railroad tank and sheet scrap	8.25 to 8.75

Cleveland

CLEVELAND, OHIO, Aug. 15, 1916.

Iron Ore.—Shippers of Lake Superior iron ore have been concerned at the announcement that some Lake vessel tonnage has been chartered for the season of 1917 at $1 a ton, free to vessel. While it is believed only a small amount of tonnage has been taken at this figure, and while also it is believed it is a part of a contract which has to do with a block of ore to be carried this season, yet it has been the topic of much interesting discussion this week in ore shipping circles. For some weeks $1 a ton, net, has been paid for some wild tonnage and this rate is likely to remain effective as an offer until the end of the present season. Ore shippers are speculating on what effect such a rate for 1917 would have upon the Lake Superior ore market. It is argued that as iron miners are getting higher wages and other mining costs have advanced, next season's ore price should be advanced. But it is felt by ore interests that while $5 for old range Bessemer might be named, such an increase would be simply handed over to vessels and would not take care of the new mining costs. Hence there is some talk of $5.50, or an advance of $1.05, but nothing at all definite has developed. Old range Bessemer has not brought $5 a ton since December, 1909; and previous to that, since November, 1906. The last time $5.50 was named as the base was in December, 1899. We quote ore prices as follows, delivered lower Lake ports: Old range Bessemer, $4.45; Masaba Bessemer, $4.20; old range non-Bessemer, $3.70; Mesaba non-Bessemer, $3.55.

Pig Iron.—The beginning of a movement of steel works and foundries for the purchase of basic pig iron is becoming apparent in the Cleveland district where more inquiry to-day is coming out for such iron than in months. Malleable iron consumers also have been sounding the market, with several fair sized inquiries in hands of sellers. One inquiry for malleable iron involving 5000 tons has been received here from an Eastern consumer. No sales have been closed recently, although now it is learned a sale of about 1000 tons of foundry iron was made some days ago at the going market. While one Tennessee furnace is offering No. 2 foundry iron for delivery through the last half of this year and first half of next, yet no Southern iron sales have been made in this district recently. Silvery irons are holding to the recent quotations, but this grade also has been quiet. We quote, delivered Cleveland, as follows:

Bessemer	$21.95
Basic	18.95
Northern No. 2 foundry	$18.70 to 18.80
Southern No. 2 foundry	18.00 to 18.50
Gray forge	18.50
Jackson County silvery, 8 per cent silicon	28.62 to 30.62
Standard low phos., Valley furnace	32.00

Finished Iron and Steel.—Practically all northern Ohio agricultural implement makers have closed at 2.50c., Pittsburgh, for their steel bar requirements for the first half of next year, and they express their satisfaction at being able to secure these bars. Some makers of steel bars who are able to make deliveries of Bessemer material within six weeks to two months are taking on good business at higher than usual prices. One mill has booked several thousand tons of bars and small shapes, and has secured 2.75c. for the shapes which usually take the bar card, together with the extras even above that price. The sheet market continues to show slight irregularities in price, especially blue annealed. Some mills are asking 3.25c., Pittsburgh, for No. 10 gage, while others are willing to shade 3c.; but these latter will do this only on narrower sheets. Bar iron continues to be quoted at 2.50c., Cleveland. We quote sheets at 2.90c. to 3c., Ohio mill, for No. 28 black; 3c. to 3.25c. for No. 10 blue annealed; and 4.25c. to 4.40c. for No. 28 galvanized. Warehouse prices are 3.25c. for steel bars and structural material, 3.65c. for plates, and 3.20c. for iron bars.

Old Material.—Sales of iron and steel scrap in the Cleveland district are infrequent and mills continue to show little interest in the market. Yet generally quotations are being maintained. Some lots of borings have been sold on the basis of $6 a net ton, Cleveland, to blast furnaces which have been using some quantities of this material. Machine shop turnings are weak, although still quoted at a minimum of $5.75 per net ton, Cleveland. Iron rolling mills are still out of the market. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton

Steel rails	$14.75 to $15.00
Iron rails	18.50 to 19.00
Steel car axles	30.00 to 32.00
Heavy melting steel	15.00 to 15.25
Carwheels	12.75 to 13.00
Relaying rails, 50 lb. and over	22.50
Agricultural malleable	12.50 to 12.75
Railroad malleable	14.00 to 14.25
Steel axle turnings	12.00 to 12.50
Light bundled sheet scrap	12.00 to 12.25

Per Net Ton

Iron car axles	$24.00 to $25.00
Cast borings	6.00 to 6.25
Iron and steel turnings and drillings	5.75 to 6.00
No. 1 busheling	11.00 to 11.25
No. 1 railroad wrought (nominal)	15.00 to 15.50
No. 1 cast	13.00 to 13.50
Railroad grate bars	10.00 to 10.50
Stove plate	10.00 to 10.25

St. Louis

ST. LOUIS, MO., Aug. 14, 1916.

Pig Iron.—Increased interest in steel making grades is noted. One inquiry for 10,000 tons of Northern basic may be increased in size if a satisfactory price is obtained. Further inquiries for both Northern and Southern basic are expected. The largest sale was for 500 tons of Northern foundry and an inquiry for 200 tons of the same grade is still pending. The feeling is that Southern warrant iron has been about cleaned up.

Finished Iron and Steel.—The advance recently reported has been accepted quietly by consumers. While no important new business has been brought out, it has

had the effect of convincing consumers that there is no immediate likelihood of a drop in quotations. This territory specified heavily early and material is, therefore, moving satisfactorily on contracts, with fabricators' yards well supplied. Specifications on light rails for coal mine use have been exceptionally heavy in the past week. Track fastenings are sold so far ahead that one user was compelled to purchase 1500 kegs of bolts from outside sources at a stiff premium. Movement out of warehouse continues active with these prices quoted: Soft steel bars, 3.15c.; iron bars, 3.10c.; structural material, 3.15c.; tank plates, 3.55c.; No. 10 blue annealed sheets, 3.45c.; No. 28 black sheets, cold rolled, one pass, 3.30c.; No. 28 galvanized sheets, black sheet gage, 5c.

Coke.—No business of importance has appeared. The small quantities taken are moved largely at a better figure than the ruling quotations on large lots.

Old Material.—The market continues quiet so far as consumer transactions are concerned, but the dealers are continuing their speculation, confident of further advances before long. Relaying rails are the strong item in the list, with a probability of premium prices being paid if only they could be obtained. The only list out during the week was one for 4000 tons from the Southern Railway. We quote dealers' price, f.o.b customers' works, St. Louis industrial district, as follows:

Per Gross Ton	
Old iron rails	$16.25 to $16.75
Old steel rails, rerolling	15.00 to 15.50
Old steel rails, less than 3 ft	15.00 to 15.50
Relaying rails, standard section, subject to inspection	23.00 to 24.00
Old carwheels	11.50 to 12.00
No. 1 railroad heavy melting steel scrap	14.50 to 15.00
Heavy shoveling steel	13.50 to 14.00
Frogs, switches and guards cut apart	14.50 to 15.00
Bundled sheet scrap	8.00 to 8.50
Per Net Ton	
Iron angle bars	$16.00 to $16.50
Steel angle bars	13.50 to 14.00
Iron car axles	24.50 to 25.00
Steel car axles	27.00 to 27.50
Wrought arch bars and transoms	19.50 to 20.00
No. 1 railroad wrought	14.50 to 15.00
No. 2 railroad wrought	14.25 to 14.50
Railroad springs	14.00 to 14.50
Steel couplers and knuckles	14.00 to 14.50
Locomotive tires, 42 in. and over, smooth inside	19.50 to 20.00
No. 1 dealers' forge	10.25 to 10.75
Cast-iron borings	6.50 to 7.00
No. 1 busheling	12.50 to 13.00
No. 1 boilers, cut to sheets and rings	9.50 to 10.00
No. 1 railroad cast scrap	11.00 to 11.50
Stove plate and light cast scrap	8.75 to 9.25
Railroad malleable	11.00 to 11.50
Agricultural malleable	10.00 to 10.50
Pipes and flues	10.50 to 11.00
Railroad sheet and tank scrap	9.75 to 10.25
Railroad grate bars	9.50 to 10.00
Machine-shop turnings	7.00 to 7.50

Birmingham

BIRMINGHAM, ALA., Aug. 14, 1916.

Pig Iron.—A shipment of 5000 tons of pig iron for Mediterranean delivery, making a total of 25,000 tons since June 15, was made from Birmingham yards the past week. A sale of several hundred tons of high sulphur and other low grades of iron has been effected for Spain. A considerable tonnage of low-grade metal, which went under market prices, has been sold. For strictly graded furnace iron the Birmingham makers get $15, with carload and 100 to 150 ton lots the usual transaction. Where quotations of $15 are made on larger quantities, nothing further is heard. In fact, no large sales are discoverable. Tennessee district furnaces will probably offer metal around $14 and $14.50, Birmingham basis, for some time. It is really a separate district and ought to be so classed on account of its lower freight rates to Northern and Western points. Florence and Sheffield irons are moving regularly by barge line into St. Louis and Chicago territory at a saving on the rail freight rate. The Woodstock Corporation has finally blown in its furnace at Anniston and is understood to be booked fairly well ahead. This is the only furnace in the Gadsden pipe and foundry district and can supply those large consumers of pig iron at minimum freight rates. The Gadsden stack of the Alabama Company is about to resume. Two foundry furnaces are billed to go out for relining in the near future and a third will follow unless the market picks up There is, therefore, no prospect of increased production except in basic, where prior demand and output records are being broken. One large furnace interest is scarcely a factor in the foundry-iron market, nor will it be this fall, due to its great need for self-manufactured basic. The inquiry is really stronger, but no market basis for Birmingham furnace iron for real business has been established. Accumulations were around 20,000 tons in July, but the output was also at maximum. Warrant stocks have gone down about 20,000 tons. A high authority predicts a scarcity of pig iron by March of next year. We quote, per gross ton, f.o.b Birmingham district furnaces, as follows:

No. 1 foundry and soft	$15.00 to $15.50
No. 2 foundry and soft	14.50 to 15.00
No. 3 foundry	14.00 to 14.50
No. 4 foundry	13.75 to 14.25
Gray forge	13.50 to 14.00
Basic	14.50 to 15.00
Charcoal	22.00 to 22.50

Cast-Iron Pipe.—Four of the five pits of the United States Cast Iron Pipe & Foundry Company's plant at Bessemer, Ala., are in operation and the Birmingham plant is making and shipping quantities of 4 to 12 in. pipe to oil fields in Texas, Louisiana and elsewhere. Other water and gas pipe makers report new business as coming in slowly, but still of sufficient volume to justify price maintenance and continuance of present rate of output. Shipments are brisk. Sanitary shops are doing little. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in. $28; 6-in. and upward, $25, with $1 added for gas pipe and 16-ft lengths.

Coal and Coke.—The steam coal trade is reported better. The railroads are taking their full specifications and in many other directions there is improvement, with better prices governing. Maximum furnace operations have for months kept coke production at top notch and it is still there. Standard beehive makes are fetching $4.25 to $4.50 per net ton, f.o.b. oven, with furnace coke at $3.25 to $3.50. Newcastle coke is going to the Woodstock Corporation, Anniston. Foundries are laying in stock liberally.

Old Material.—While there is no improvement generally in the old material market, one dealer secured several hundred tons of steel axles and got $24 for them f.o.b. Atlanta. Another dealer is hopeful of filling an export order at $28 if he can secure favorable freight rates. Lowest ocean rates recently offered were around $28. Steel mills manufacturing shrapnel have a waste of 30 per cent which goes to scrap accumulations and this is affecting the market. Steel scrap is somewhat more active. We quote, per gross ton, f.o.b. dealers' yards, prices to consumers, as follows:

Old steel axles	$24.00 to $30.00
Old steel rails	10.00 to 10.50
No. 1 steel scrap	9.25 to 9.75
No. 1 wrought scrap	12.50 to 13.00
No. 1 cast scrap	10.50 to 11.00
Extra heavy cast scrap	9.50 to 10.00
Stove plate and light	9.00 to 9.50
Old carwheels	9.50 to 10.00
Tram carwheels	9.50 to 10.00

San Francisco

SAN FRANCISCO, CAL., Aug. 8, 1916.

The local iron market is unsettled. The principal matter of interest is the advance in freight rates to Pacific terminals, announced to take place Sept. 1, which is already causing some price revision, and has brought out many requests for prompt shipment. The new advance, added to prices already very high, is not well received, and is expected to curtail consumption perceptibly. Local labor conditions, as well as the threatened railroad tie-up, are rather disquieting and tend to limit activity in several directions, though there are no serious disturbances at the moment. General distributive business continues seasonably quiet, while specifications from manufacturers hold up in good shape.

Bars.—Oriental business is still curtailed by lack of shipping facilities, but the domestic trade is taking all

the local mills can produce for some months ahead. There has been some complaint that deliveries were not well balanced as to sizes, but it is stated that this will soon be remedied. A considerable tonnage has continued to come from Eastern mills, but the new freight rate of 94c. per 100 lb. from Pittsburgh will be a great handicap on shipments from that source. Jobbing business is fairly active for the season, and specifications on contracts are satisfactory. The building demand also holds up well. Prices are unchanged as yet.

Structural Material.—The strike is still in effect. Local fabricating shops are doing practically nothing, while advancing prices and uncertainty as to future deliveries have almost put a stop to new figuring, many jobs being temporarily withdrawn from the market. There is a rather active demand for shapes from stock, and the price on carloads to the trade has been raised to 3.85c. in anticipation of the freight advance. Local mills are rolling some angles over 3 in., but the output is still insignificant. No important new contracts are reported, but there are numerous projects in contemplation, including an 800-ft. steel bridge over the Santa Ynez River in Santa Barbara County, bids to be opened Aug. 21; and some small bridges in San Bernardino County, bids to be opened Aug. 28. Plans are expected soon for the new Fairmount school, this city. There is talk of a large office building on East Seventh Street, Los Angeles.

Plates.—Aside from the usual heavy specifications and efforts to get all the tonnage possible shipped before Sept. 1, there is little to report in the local shipbuilding line. Several vessels have been completed, their places on the ways being immediately taken by new work. As the requirements are well covered by contracts, shipbuilders have taken nothing from stock for some time. Many smaller buyers also anticipated their requirements early in the year, in some cases more than was warranted, and the jobbing trade has narrowed down to rather small limits.

Sheets.—Local prices on galvanized sheets have not changed since the recent decline. The demand is still closely limited, and the outlook is less encouraging than it appeared recently, owing especially to lack of building activity. There is a fair demand for the manufacture of irrigation specialties, but buyers do not take hold readily. Current business in blue annealed also is quiet, though manufacturers are specifying freely.

Wrought Pipe.—Consuming demand in the plumbing trade does not appear very healthy, and building conditions are not encouraging. Stocks of merchant sizes also are in fair shape. In anticipation of the freight advance, the larger buyers at all coast points are trying to rush shipments during the present month. The advance is expected to amount to about $4.60 per ton from Pittsburgh. The call for oil country goods is developing greater strength, with a great deal of new development in prospect.

Cast-Iron Pipe.—This class of material will be most seriously affected by the higher freight rate, the advance expected being about $6.60 per ton from Birmingham, making a rate of $17.70. For the present there is rather a rush of small orders, but after next month a material curtailment of tonnage is expected. Santa Barbara has ordered about 89 tons, and bids have just been opened for 90 tons for Healdsburg, Cal., and 30 tons for Phoenix, Ariz. Glendale, Cal., takes bids Aug. 17 for 10,000 ft. of 20-in. pipe, and Orange is out for a small lot of 4-in. An inquiry is expected shortly from a Los Angeles water district.

Ferroalloys, Etc.—Ferromanganese remains fairly steady, with offerings about sufficient for current needs, and enough new arrivals to prevent any immediate fear of shortage. Some ferrosilicon has arrived recently, but prices are still very firm. A shipment of chrome ore arrived recently from Australia.

Pig Iron.—Current needs have been covered in good shape by old contracts, and melters were rather slow in starting on their second-half contracts. With a freight rate of $12.34 per gross ton from Birmingham, to take effect Sept. 1, however, efforts are being made to get in as much as possible before that time, giving the market a momentary appearance of activity. The new rate would no doubt favor a return to the use of foreign iron if it were available, but except for small scattering arrivals of Chinese iron there is nothing coming from foreign sources. Local agencies quote No. 1 Southern foundry iron at about $26 per gross ton.

Coke.—The coke market is affected in the same way as pig iron by the impending advance in freight, though the current requirements of foundries show little change, being in the aggregate considerably larger than for some years past. There is a little easier feeling as to prices, but most offerings of Southern coke are still held at $15 to $15.50 per net ton, favored brands commanding a premium.

Old Material.—Some of the largest melters have practically withdrawn from the market on steel scrap, having abundant supplies for all nearby requirements either under contract or on hand. There is a rather large tonage held by speculators, which finds a narrow market. Occasional sales are made at about $10 to $12 per gross ton, with lighter or less desirable offerings even lower. Cast-iron scrap holds fairly steady at $16 to $18 per net ton, with a normal demand.

New York

NEW YORK, Aug. 16, 1916.

Pig Iron.—The situation has changed within a week. New inquiries have come up amounting to 35,000 to 40,000 tons. Thus far no great amount of this business has been closed, but the inquiries are live and early buying is expected. The International Steam Pump Company, which came into the market recently for about 16,000 tons of various grades for delivery in the first half of 1917, followed this up by asking for over 18,000 tons for the second half of next year. It is a question if quotations in this case which the buyer desired to have left open until it was ready to close, will be allowed to remain effective indefinitely. Usually a buying movement, after as many weeks of dullness as the pig iron market has seen, starts on concessions. Such concessions may be made in this instance, but in one or two cases sellers have adhered to prices they have quoted recently, and in one important case a quotation has been withdrawn. At Buffalo something under $18.50 for No. 2 X has been quoted, but in other cases $18.50, Buffalo furnace, is adhered to. Among new business is an inquiry for 11,000 to 12,000 tons of basic iron for a New Jersey plant. There is also considerable inquiry for malleable interests in Connecticut and a railroad supply company has asked for 3500 tons of various grades for a Southern plant. Another large inquiry has come up in the New York district which may run above 15,000 tons. The report that France was in the market for 30,000 tons of Bessemer was correct, but it now appears that this business is held in abeyance. Further sales of Southern iron for export have been made and shipments from Alabama are going forward on this account each week. Some concessions have been made recently in eastern Pennsylvania furnace transactions and $19.25 for No. 2 X at Jersey City has been shaded. The New Haven Railroad removed its embargo on pig iron and coke Aug. 11. The amount of Bessemer iron taken by Eastern furnaces for export has been increased lately and in one or two cases furnace operations on such iron will continue to the end of the year. Shipments to Bridgeport, Conn., have been affected by strikes at several foundries there. We quote at tidewater for early delivery: No. 1 foundry, $20 to $20.50; No. 2 X, $19.25 to $19.75; No. 2 plain, $19 to $19.50; Southern iron at tidewater, $19.50 to $20 for No. 1 and $18.75 to $19.25 for No. 2 foundry and No. 2 soft.

Ferroalloys.—Inquiry for ferromanganese is brisker than for many weeks, but the quantity is not large. Probably 1000 tons is before the market. There have also been a few sales of small lots which have gone at $175, seaboard, for nearby delivery, one sale involving 400 tons, though recent reports of $170 sales were authentic. Arrivals continue satisfactory, including a consignment of about 3000 tons for delivery on contract to special consumers. On a rumor that the British

Government may again restrict ferromanganese shipments, confining them to munition makers only, no very definite information is obtainable. One or two producers, it is understood, have obtained no August licenses to ship thus far. Spiegeleisen is very quiet at $45 to $55, furnace, on contract. Fifty per cent ferrosilicon is strong and active, with material for nearby delivery selling in some cases, in small lots, above $90 at furnace.

Cast-Iron Pipe.—Perth Amboy, N. J., will let a contract this week for pipe laying which will involve the purchase of 600 tons of 30 and 36 in. pipe. No other public lettings of importance are announced. Private buying continues in good volume. Prices are firm. Carload lots of 6-in., class B and heavier, are quoted at $30.50 per net ton, tidewater, class A and gas pipe taking an extra of $1 per ton.

Old Material.—While the market is extremely quiet, and the immediate outlook presents little of an encouraging character, dealers are hopeful, looking for a much better demand and higher prices as the fall develops. Eastern Pennsylvania consumers are doing practically no buying in this market. Embargoes prevent shipments to some steel works and others seem to be well stocked. The Pittsburgh market also appears to be closed to local dealers for the present, as requests have been received for further shipments to be held up. On the basis of recent transactions, brokers who purchase for the Pittsburgh market would probably pay $13.25 to $13.50, New York, for heavy melting steel scrap if they could make delivery. Brokers quote buying prices for the Eastern trade about as follows to local dealers and producers per gross ton, New York:

Heavy melting steel scrap (eastern Pennsylvania specifications)	$11.75 to $12.00
Old steel rails (short lengths) or equivalent	12.50 to 12.75
Relaying rails	27.50 to 28.00
Rerolling rails	16.00 to 16.50
Rerolling rails (for export)	19.00
Iron car axles	28.00 to 29.00
Steel car axles (for export)	34.00 to 35.00
No. 1 railroad wrought	17.50 to 18.00
Wrought-iron track scrap	15.50 to 16.00
No. 1 yard wrought, long	13.50 to 14.00
No. 1 yard wrought, short	11.75 to 12.00
Light iron (nominal)	3.50 to 4.00
Cast borings (clean)	6.75 to 7.25
Machine shop turnings (nominal)	4.25 to 4.50
Mixed borings and turnings	4.25 to 4.50
Wrought pipe	10.50 to 10.75
Old carwheels (nominal)	15.00 to 15.50
Malleable cast (railroad)	12.00 to 12.50

Foundries are still doing little or nothing in the purchase of old material. Dealers' quotations to consumers of cast scrap are as follows, per gross ton, New York:

No. 1 cast (machinery)	$16.00 to $16.25
No. 2 cast (heavy)	14.50 to 15.00
Stove plate	11.00 to 11.25
Locomotive grate bars	10.00 to 10.25

Finished Iron and Steel.—Price conditions are exceedingly firm, almost wholly because of the large offerings from abroad, closed and closing. Some of these are being executed somewhat secretly and definite facts are for the moment withheld. And inquiry is broadening in scope. Meanwhile the domestic market is dull, as is to be expected at this period, but the evident strengthening of market prices and the indication of an indefinitely long period at the high levels has brought about activity in building projects in New York City. Railroad interest has not yet brightened, about the only rail offerings being 2500 tons for street railroads and 2000 cars placed by the Lake Shore. Foreign inquiry for plates is strong, and sales of several hundred ton lots, part to Japan, have been made, at a shade below 4c., Pittsburgh, for delivery in November and December, and 3c. for the first part of 1917. In bars a sale of 5000 tons at 2.50c., Pittsburgh, is noted. Bar iron mill products are in general no easier, bar iron deliveries being 8 to 10 weeks, but business could easily be placed for the larger size bolts. Warehouse demand has tapered off. The apartment house and loft building activity includes two Herzog apartments mentioned in this column a few weeks ago; two loft buildings for the Holland Realty Company, one at 35 West Forty-fifth Street taking 500 tons and one at 233 West Thirty-sixth Street taking 600 tons; a 600-ton structure for Bing & Bing on West Seventy-first Street; a Tishman loft, for the Jatison Construction Company, Inc., 15 West Thirty-sixth Street, 1000 tons, and the addition to the McAlpin Hotel, 1200 tons. One of the Levy buildings, 600 tons, has been placed with the H. C. Stowe Construction Company, and the Passaic Structural Steel Company has been awarded 1000 tons for the Bronson apartment, Broadway and Ninety-first Street. Decision is early expected on 2500 tons for the Halifax terminal, and new bids are asked on a customs examining warehouse at Toronto, taking 1500 to 2000 tons. We quote mill shipments of plain structural material at 2.669c. to 2.919c., New York; steel plates at 3.169c. to 4.169c., depending on the width of the plate as much as on delivery, and with universal plates easier by $5 to $10 per ton than sheared plates; steel bars at 2.769c. to 2.919c., the lower price for open-hearth steel at the convenience of the mill and little if any this year, and for Bessemer bars in 60 to 90 days for an attractive lot; bar iron at 2.669c., New York. Out of warehouse we quote iron and steel bars and shapes at 3.25c. to 3.30c., New York, and plates at 4c to 4.25c.

Buffalo

BUFFALO, N. Y., Aug. 15, 1916.

Pig Iron.—Sales for the past 10 days have been heavy, both for last quarter and first half delivery, and inquiry is coming in in large volume. This includes 35,000 tons for the leading pump interest, 10,000 tons from Massachusetts foundries and 25,000 tons of steel-making iron for use in making war munitions. Some orders for the latter grade of iron have been placed. Local users have taken considerable iron for the remainder of the year and are now inquiring for first quarter. It was not expected that a buying movement would commence before Sept. 1, but it has apparently started in some weeks earlier, and it looks as though it might develop to large proportions. Prices are strengthening. Some producers are inclined to anticipate higher prices in the near future and are holding off on making quotations. We quote as follows, f.o.b. furnace, Buffalo:

No. 1 foundry	$19.00 to $19.50
No. 2 X foundry	18.50 to 19.00
No. 2 plain	18.50 to 18.75
No. 3 foundry	18.50 to 18.75
Gray forge	18.25 to 18.50
Malleable	18.50 to 19.00
Basic	19.00 to 20.00
Bessemer	21.00 to 22.00
Charcoal, regular brands and analysis	21.00 to 22.00

Finished Iron and Steel.—Mill conditions are not easing up as regards deliveries, few mills having anything to offer for 1916. Tremendous export tonnages have been booked and a buying movement to take care of pressing domestic needs is under way. Many mills are practically scheduled in full over the first quarter of 1917, and in some instances over the entire first half, and some selling agencies are of the opinion that it would not require a very extensive buying movement to develop a condition where it will be a question of ability to secure steel at all rather than a question of price.

Old Material.—Good demand continues for heavy melting steel, principally for shipment to Pittsburgh and Valley points. Dealers are chary of making large sales in any line, as signs indicate a brisker demand in the near future. The current week, however, shows no change in prices. We quote dealers' asking prices, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$15.50 to $16.00
Low phosphorus steel	20.00 to 20.50
No. 1 railroad wrought scrap	17.25 to 17.75
No. 1 railroad and machinery cast scrap	15.50 to 16.00
Steel axles	30.00 to 31.00
Iron axles	26.00 to 27.00
Carwheels	13.00 to 13.50
Railroad malleable	15.00 to 15.50
Machine shop turnings	6.00 to 6.50
Heavy axle turnings	12.00
Clean cast borings	7.25 to 7.75
Iron rails	18.00 to 18.50
Locomotive grate bars	11.50 to 12.00
Stove plate (net ton)	11.00 to 11.50
Wrought pipe	12.00 to 12.50
Bundled sheet scrap	11.50 to 12.00
No. 1 busheling	13.00 to 13.50
No. 2 busheling	11.00 to 11.50
Bundled tin scrap	15.00 to 15.50

British Steel Market

Tin Plate Makers Out of the Market—Steel Famine Acute—Pig Iron Strong

(*By Cable*)

LONDON, ENGLAND, Aug. 16, 1916.

The pig-iron market is strong with forward sales curtailed. Pressure for deliveries is unrelaxed and new business in hematite iron is most difficult. American billets are firm, with 4-in. quoted at $63 to $65 for October to December delivery. Tin plates are strong and makers have withdrawn from the market owing to the steel famine. Tin-plate exports are now subject to licenses and 31s. has been paid. Quotations are as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 31s., against 29s. to 30s. a week ago.
Steel black sheets, No. 28, export, f.o.b. Liverpool, £20.
Steel ship plates, Scotch, delivered local yards, £13 17s. 6d.
Steel rails, export, f.o.b. works, £10 17s. 6d.
Hematite pig iron, f.o.b. Tees, about 140s.
Sheet bars (Welsh) delivered at works in Swansea Valley, £10 7s. 6d.
Steel bars, export, f.o.b. Clyde, £18.
Ferromanganese (nominal), £35.
Ferrosilicon, 50 per cent, c.i.f., £29.

Pig-Iron Output to Be Increased—Permits for All Exports Required

LONDON, England, Aug. 1, 1916.—Evidences of tightness tend to multiply, while operations are certainly interfered with by hot weather. Labor scarcity is another serious drawback apart from the inadequate supplies of raw material. In consequence of the extreme exigencies arising from an unparalleled situation, while munition requirements must be protected, government control has been tightened further. Export prohibitions and restrictions were extended in various directions, including galvanized sheet iron and black plates, except to allied European countries, Spain and Portugal. As far as can be gathered, permits are now required for practically all exports. Merchant business is utterly paralyzed and the negotiation of new orders presents insuperable difficulties.

The pig-iron market continues strong, although there has been no change in prices in either Cleveland or hematite, an increased output being urgently needed in view of the huge requirements. Deliveries continue on a good scale under strict control, while heavy shipments were made to France. New business is severely handicapped by the fact that producers are already heavily booked. Within the next few weeks the working of additional furnaces should afford relief. The Cyfarthfa furnaces in Wales which have been idle for years are coming into operation on hematite, and the Cwmbran furnace is also working, while several more furnaces of the Workington Steel Company are expected to be in operation in Cumberland within the next few months. Everything capable of being turned on the production of hematite iron is being utilized. The blast-furnace people, however, are not at all willing to lay in stocks of ore at present prices, fearing that it will be left long on the market when the war ends.

Demands for war material being ever on the increase, the mills are hard pressed and handicapped by the lack of skilled labor and more especially by the shortage of semi-finished steel, chiefly due to producers being largely engaged in turning out shell steel and other materials required by the British and French Governments. Under the circumstances, the filling of ordinary requirements is more difficult than ever.

Since the announcement of the prohibition of exports to all destinations, the market for galvanized sheets has been brought almost to a standstill, works almost without exception not quoting for, pending developments as to permits. The rolling mills, moreover, find it hard to get sheet bars and the cost of spelter has risen again considerably.

The tin-plate market has remained depressed, the demand being still absolutely lifeless, with one or two works still taking orders near 28s. per box basis, 20 x 14, in order to keep mills going, although makers generally are merely looking on. An upward reaction seems due, owing to the serious outlook as regards steel and labor.

Welsh bars are virtually unobtainable at any price, and the efforts made to secure American material have met with but little success, although fair quantities of other American semi-finished material are being secured, billets now being quoted at about $62 to $63 cif., September-October shipment.

Iron and Industrial Stocks

NEW YORK, Aug. 16, 1916.

Contrary to general expectation, values of securities have not only shown strength the past week but in the case of some stocks a decided advancing tendency was manifested. The poor crop report and the apprehension of a general railroad strike appeared to have had less influence on stock values than the announcement of more European war orders. The very favorable showing made by the American Locomotive Company undoubtedly made an impression in causing a realization of the profits now being reaped by manufacturers of munitions. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com.	21½-23¾	Ry. Steel Spring, pref.	98¾
Allis-Chal., pref.	74½-79¼	Republic, com.	46¾-49
Am. Can, com.	55¼-58¾	Republic, pref.	110¼-112¼
Am. Can, pref.	110¼-112	Sloss, com.	44½-46
Am. Car & Fdy., com.	58 - 61½	Pipe, com.	19¼-21
Am. Car & Fdy., pref.	115¾-117	Pipe pref.	53
Am. Loco., com.	69⅝-73½	U. S. Steel, com.	86⅝-89½
Am. Loco., pref.	102½-104¾	U. S. Steel, pref.	118 -118⅝
Am. Steel Fdries.	51⅝-53½	Va. I. C. & Coke	46
Bald. Loco., com.	71½-76¼	Westing. Elec.	57¼-59⅝
Beth. Steel, com.	430 -470	Am. Rad., com.	392 -393
Beth. Steel, pref.	130 -135	Am. Ship, com.	47 - 49
Colo. Fuel	43¾-45½	Am. Ship, pref.	90 - 90½
Deere & Co., pref.	90¼-92	Chic. Pneu. Tool	67½-68
Gen. Electric	168¾-170¾	Cambria Steel	82
Gt. No. Ore Cert.	35 - 36¾	Lake Sup. Corp.	10¼-11
Int. Harv. of N. J., com.	114 -116	Warwick	9¼- 9¾
Int. Harv. of N. J., pref.	118½	Cruc. Steel, com.	68⅛-73¼
Lacka. Steel	70½-72⅞	Cruc. Steel, pref.	115¼-116¼
Nat. En. & Stm., com.	22¾- 24	Harb.-Walk. Refrac. com.	95 -101
N. Y. Air Brake	127½-138¼	Harb.-Walk. Refrac. pref.	103 -104
Pitts. Steel, pref.	99 -100	La Belle Iron, com.	53¼- 54
Pressed Stl., com.	48⅜- 52¼	La Belle Iron, pref.	130 -132
Pressed Stl., pref.	99⅞	Driggs-Seabury	91 - 99
Ry. Steel Spring, com.	44 - 46½	Midvale Steel	61 - 62¾

Dividends

The International Nickel Company, 6 per cent on the common stock, payable Sept. 1.

The Pratt & Whitney Company, regular quarterly, 1½ per cent on the preferred stock, payable Aug. 15.

The Niles-Bement-Pond Company, regular quarterly, 1½ per cent on the preferred stock, payable Aug. 15, and 2½ per cent (an increase of 1 per cent) on the common stock, payable Sept. 20.

The Harbison-Walker Refractories Company, regular quarterly, 1½ per cent, and extra 2 per cent on the common stock, payable Sept. 1.

The General Electric Company, regular quarterly, 2 per cent, payable Oct. 14.

The Moline Plow Company, regular quarterly, 1¾ per cent on the preferred stock, payable Sept. 1.

The Maxwell Motor Company, initial quarterly, 2½ per cent on the common stock, payable Oct. 2 and 6 per cent on the second preferred, payable in four quarterly installments, and 7 per cent on the first preferred, payable quarterly.

The Gulf States Steel Company, regular quarterly, 1¾ per cent on the first preferred stock, payable Oct. 2, and quarterly of 1½ per cent on the common, to be paid Nov. 1.

The Ph. van Ommeren Corporation, New York branch of the old Dutch shipping house of Phillippus van Ommeren, established in Rotterdam nearly a century ago and now doing business in London under the name of Phs. van Ommeren, Ltd., also in Amsterdam and Antwerp, has opened offices at 42 Broadway. The business in this country is in the hands of William H. Scholz, for the past two years attached to the American legation at the Hague as commercial adviser. The company plans to divert some of its steamers now plying between New York and the Far East to a direct New York-Rotterdam route, with a view to increasing the trade between the United States and Holland.

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, effective from April 10, 1916, per 100 lb.; New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30.7c.; Birmingham, Ala., 45c.; Pacific coast (by rail only), 65c.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees 3 in. and over, 2.60c. to 2.75c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs	.10
Angles, 3 in. on one or both legs less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Handrail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive.	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Plates.—Tank plates, ¼ in. thick, 6 in. up to 100 in. wide, 3c. to 4c., base, net cash, 30 days, or ½ of 1 per cent discount in 10 days, carload lots. Extras are:

Quality Extras

	Cents per lb.
Tank steel	Base
Pressing steel (not flange steel for boilers)	.10
Boiler and flange steel plates	.15
"A. B. M. A." and ordinary firebox steel plates	.20
Still bottom steel	.30
Locomotive firebox steel	.50
Marine steel, special extras and prices on application	

Gage Extras

Rectangular, ¼ in. thick, over 6 in. wide to 100 in. wide.	Base
Lighter than ¼ in., to 3/16 in., up to 72 in. wide	.10
*Lighter than ¼ in., including 3/16 in., over 72 in. to 84	.20
*Lighter than ¼ in., including 3/16 in., over 84 in. to 96	.30
*Lighter than ¼ in., including 3/16 in., over 96 in. to 100	.40
*Lighter than ¼ in., including 3/16 in., over 100 in. to 102	.45
Lighter than 3/16 in., including No. 8, up to 72 in. wide	.15
*Lighter than 3/16 in., including No. 8, over 72 in. to 84	.25
*Lighter than 3/16 in., including No. 8, over 84 in. to 96	.35
Lighter than No. 8, including No. 10, up to 60 in. wide	.30
Lighter than No. 8, including No. 10, over 60 in. to 64	.35

Up to 72 in., not less than 10.2 lb. per sq. ft. will be considered ¼ in.
Over 72 in. must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft. to take base price.
Over 72 in. wide, ordered less than 11 lb. per sq. ft., down to weight of 3/16 in., take price of 3/16 in.
Over 72 in., ordered weight 3/16 in., take No. 8 price.
Over 72 in., ordered weight No. 8, take No. 10 price.

Width Extras

Over 100 in. to 110 in. inclusive	.05
Over 110 in. to 115 in. inclusive	.10
Over 115 in. to 120 in. inclusive	.15
Over 120 in. to 125 in., inclusive	.25
Over 125 in. to 130 in. inclusive	.50
Over 130 in.	1.00

Length Extras

Universal plates 80 ft. long up to 90 ft. long	.05
Universal plates 90 ft. long up to 100 ft. long	.10
Universal plates 100 ft. long up to 110 ft. long	.20

Cutting Extras

No charge for rectangular plates to lengths 3 ft. and over	
Lengths under 3 ft. to 2 ft. inclusive	.25
Lengths under 2 ft. to 1 ft. inclusive	.50
Lengths under 1 ft.	1.55
Circles 3 ft. in diameter to 100 in.	.30
Circles over 100 to 110 in. (width extra)	.35
Circles over 110 to 115 in. (width extra)	.40
Circles over 115 to 120 in. (width extra)	.45
Circles over 120 to 125 in. (width extra)	.55
Circles over 125 to 130 in. (width extra)	.80
Circles over 130 in. (width extra)	1.30
Circles under 3 ft. to 2 ft. inclusive	.55
Circles under 2 ft. to 1 ft. inclusive	.80
Circles under 1 ft.	1.85

Half circles take circle extras.
Sketches, not over four straight cuts, inc. straight taper .10
Sketches having more than four straight cuts .20
Plates sheared to a radius take complete circle extras.

*Including extra for width.

Wire Rods.—Including chain rods, $55 to $60.

Wire Products.—Prices to jobbers effective Aug. 5: Fence wire, Nos. 6 to 9, per 100 lb., terms 60 days or 2 per cent discount in 10 days, carload lots, annealed, $2.55; galvanized, $3.25. Galvanized barb wire and staples, $3.45; painted, $2.75. Wire nails, $2.60. Galvanized nails, 1 in. and longer, $2 advance over base price; shorter than 1 in., $2.50 advance over base price. Cement-coated nails, $2.50. Woven wire fencing, 61½ per cent off list for carloads, 60 off for 1000-rod lots, 59½ off for less than 1000-rod lots.

The following table gives the price per 100 lb. to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	6 to 9	10	11	12&12½	13	14	15	16
Annealed	$2.60	$2.65	$2.70	$2.75	$2.85	$2.95	$3.05	$3.15
Galvanized	3.30	3.35	3.40	3.45	3.55	3.65	4.10	4.20

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card in effect on black pipe from April 21, 1916, and on galvanized from July 24, 1916, all full weight pipe:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	63	35½	⅛ and ¼	52	24
½	67	51½	⅜	53	25
¾ to 3	70	55½	½	57	38
			¾ to 1½	60	43

Lap Weld

2	65	50½	1¼	48	31
2½ to 6	68	53½	1½	54	38
7 to 12	65	49½	2	55	39
13 and 14	63½	..	2½ to 4	57	42
15	51	..	4½ to 6	57	42
			7 to 12	56	41

Reamed and Drifted

1 to 3, butt	68	53½	¾ to 1½, butt	55	37
2, lap	63	48½	1¼, lap	43	25
2½ to 6, lap	66	51½	1½, lap	49	32
			2, lap	50	33
			2½ to 4, lap	52	36

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	59	40½	⅛, ¼ and ⅜	52	34
½	64	50½	½	57	43
¾ to 1½	68	54½	¾ to 1½	61	45
2 to 3	69	55½			

Lap Weld, extra strong, plain ends

2	63	49½	1¼	50	33
2½ to 4	66	52½	1½	55	39
4½ to 6	65	51½	2	57	42
7 to 8	61	45½	2½ to 4	59	45
9 to 12	56	40½	4½ to 6	58	44
			7 to 8	52	38
			9 to 12	47	33

Butt Weld, double extra strong, plain ends

½	55	43½	½	44	31
¾ to 1½	58	46½	¾ to 1½	47	34
2 to 2½	60	48½			

Lap Weld, double extra strong, plain ends

2	55	43½	1½	44	30
2½ to 4	57	45½	2	44	30
4½ to 6	56	44½	2½ to 4	46	35
7 to 8	51	35½	4½ to 6	45	34

To the large jobbing trade an additional 5 per cent is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Sheets.—Makers' prices for mill shipments on sheets of U. S. standard gage, in carload and larger lots, are as follows, 30 days net, or 2 per cent discount in 10 days:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	2.95 to 3.20
Nos. 9 and 10	3.00 to 3.25
Nos. 11 and 12	3.05 to 3.30
Nos. 13 and 14	3.10 to 3.35
Nos. 15 and 16	3.20 to 3.45

Box Annealed Sheets, Cold Rolled

Nos. 17 to 21	2.70 to 2.85
Nos. 22 and 24	2.75 to 2.90
Nos. 25 and 26	2.80 to 2.95
No. 27	2.85 to 3.00
No. 28	2.90 to 3.05
No. 29	2.95 to 3.10
No. 30	3.15 to 3.30

Galvanized Sheets of Black Sheet Gage

Nos. 10 and 11	3.25 to 3.35
No. 12	3.35 to 3.45
Nos. 13 and 14	3.35 to 3.45
Nos. 15 and 16	3.45 to 3.55
Nos. 17 to 21	3.60 to 3.70
Nos. 22 to 24	3.70 to 3.80
Nos. 25 and 26	3.85 to 3.95
No. 27	4.10 to 4.20
No. 28	4.25 to 4.35
No. 29	4.40 to 4.50

Boiler Tubes.—Discounts on less than carloads, freight to destination added, effective from April 15, 1916, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1¼ in.	35	1¼ in.	27
1¾ and 2 in.	47	1¾ and 2 in.	39
2¼ in.	44	2¼ in.	36
2½ and 2¾ in.	50	2½ and 2¾ in.	42
3 and 3¼ in.	55	3 and 3¼ in.	47
3½ to 4½ in.	56	3½ to 4¼ in.	48
5 and 6 in.	49	5 and 6 in.	41
7 to 13 in.	46	7 to 13 in.	38

Locomotive and steamship special charcoal grades bring higher prices.

1¾ in., over 18 ft., and not exceeding 22 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

Metal Markets

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin,	Lead		Spelter	
		Electro-	New	New	St.	New	St.
Aug.	Lake	lytic	York	York	Louis	York	Louis
9	26.75	26.50	37.80	5.95	5.75	8.37½	8.12½
10	26.75	26.50	38.15	5.95	5.75	8.37½	8.12½
11	26.75	26.50	38.55	5.95	5.75	8.37½	8.12½
12	26.75	26.50	.....	5.95	5.75	8.50	8.25
14	26.75	26.50	39.10	6.00	5.85	8.75	8.50
15	26.75	26.50	39.00	6.00	5.90	9.00	8.75

NEW YORK, Aug. 16, 1916.

Copper is firmer and more active. Tin is higher and strong. Lead is in better demand. Spelter is decidedly more active and advancing. Antimony, while lower, has a better tone.

New York

Copper.—The market has been filled with rumors of a large foreign demand from various European countries, especially Great Britain, the aggregate running to 250,000,000 lb., or more. Thus far this has been mostly talk, but it has had its influence in making the market firmer. Had any large sales actually been made prices would have advanced. There is no question, however, that foreign inquiry is very brisk and that the tone of the market is much stronger. Domestic inquiry is reported as increasing at a rapid rate, caused partly by the desire of consumers to anticipate any large foreign buying. Some sales are reported for both foreign and domestic account. There seems to be no question that a buying movement of considerable proportions is near at hand if not already started. There is no evidence of any weakness and the general attitude is a waiting one. The London market stood yesterday at £126 against £124 the previous week. Exports this month, including yesterday, were 13,456 tons. A typographical error was made last week in reporting the June exports as imports—an obvious mistake. Spot and August electrolytic was quoted yesterday at 26.50c., cash, New York. Lake is nominal at 26.75c. cash.

Tin.—A fair business has been done and the market is more interesting. Improvement began to manifest itself at the end of week before last. On last Tuesday there was a good demand for Banca tin and a fair quantity was sold, as well as some Straits tin for Eastern shipment. Total sales were 200 to 250 tons. On the next day inquiry was fair but on Thursday it became known that sales of about 225 tons were made the day before. Late Friday a moderate boom started and sales of 200 or more tons were reported. There was very little inquiry on Saturday and sales would have been larger had there been more sellers, but at that 100 to 150 tons changed hands. This week moderate sales have been made, mostly for spot, August and September delivery, and yesterday dullness prevailed with spot Straits tin quoted at 39c., New York. The arrivals this month total 2497 tons, with 3135 tons afloat.

Lead.—The position of lead is stronger, and the price has been advancing daily. There was a spurt in demand early this week, and some good sales have been made. The general tone is firm and active, with inquiry increasing from both foreign and domestic sources. While the independents have been underselling the leading interest, yesterday they were nearly up to the latter's price, and had little to offer for prompt shipment. The New York quotation yesterday was 6c., and St. Louis 5.90c. Exports this month, including yesterday, have been 758 tons, against 429 tons a week ago.

Antimony.—It is believed that the market has reached the bottom and that an upward movement is at hand. While spot metal has sold as low as 9½c., duty paid, in the last week, it is now quoted at 10c., with demand better and some business done with Canada.

Spelter.—One broker reports a more active inquiry in the past two days than at any time in several months. It has represented lots of 250 to 1000 tons, from both foreign and domestic interests, with good sales made. The tone is optimistic, and prices have been advancing. Yesterday, spot at New York was quoted at 9c., and at St. Louis 8.75c. For last quarter, 8.25c. to 8.50c., New York, is asked. Galvanizers are reported as entering the market more actively, and the general demand is much better.

Aluminum.—The market is strong at 59c. to 60½c. for No. 1 virgin metal, 98 to 99 per cent pure.

Old Metals.—The market is stronger, except on lead and zinc. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible	23.50 to 24.50
Copper, heavy and wire	22.50 to 23.50
Copper, light and bottoms	19.00 to 20.00
Brass, heavy	13.50 to 14.50
Brass, light	11.00 to 12.00
Heavy machine composition	18.00 to 18.75
No. 1 yellow rod brass turnings	14.00 to 14.75
No. 1 red brass or composition turnings	14.50 to 15.50
Lead, heavy	5.50
Lead, tea	5.00
Zinc	6.50 to 7.50

Chicago

AUG. 14.—Greater activity in copper has been accompanied by added strength in the market and higher prices. Tin also has moved up, and for prompt spelter quotations are decidedly firmer and at higher levels. We quote: Casting copper, 25c. to 25.50c.; Lake copper, 26.50c. to 27c.; tin, carloads, 39.50c. to 40c., and small lots, 40.50c.; lead, 5.90c. to 5.95c.; spelter, 8.75c. to 9c.; sheet zinc, 15c.; Cookson's antimony, 50c.; other grades, 12.50c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 18.50c.; copper bottoms, 16.75c.; copper clips, 17.75c.; red brass, 16c.; yellow brass, 12c.; lead pipe, 4.50c.; zinc, 5c.; pewter, No. 1, 27c.; tinfoil, 27.50c.; block tin pipe, 32.50c.

St. Louis

AUG. 14.—Non-ferrous metals have been quiet. Quotations at the close to-day were: Lead, 5.92½c.; spelter, 8.25c.; tin, 41c.; Lake copper, 26c.; electrolytic copper, 25.75c.; antimony, 15c. In the Joplin ore district zinc blende dropped another $5 per ton. The basis range for 60 per cent ore was $45 to $65, with the average for the week $55. Calamine was unchanged, ranging from $35 to $45, with the district average about $36. Lead ore was steady at $65. One remarkable feature of the market is that lead ore and choice zinc blende are now quotable at the same figure. On miscellaneous scrap metals we quote as follows, dealers' buying prices: Light brass, 7.50c.; heavy yellow brass, 10.50c.; heavy red brass and light copper, 14.50c.; heavy copper and copper wire, 17c.; pewter, 25c.; tinfoil, 30c.; zinc, 4.50c.; lead, 5c.; tea lead, 3.50c.

The Tivani Steel Company, Belleville, Ont., Canada, which has been experimenting for some time on an electric smelting process for the direct reduction of refractory ores, is now about to engage on a commercial scale in the manufacture of high-speed molybdenum steel. A three-phase electric furnace is used.

A booklet on fire prevention and protection for the use mainly of its employees has been issued by B. F. Avery & Sons, plow manufacturers, Louisville, Ky. Its 40 pages discuss the causes of fire, the company's fire-fighting facilities and what the employees are supposed to do in the emergency.

Exports of tin from the Federated Malay States in June were 3435 tons, against 3729 tons in May and 4048 tons in June, 1915. For the first half of 1916 they were 21,725 tons, against 23,318 tons to July 1, 1915, and 24,902 tons to July 1, 1914.

The International Sales Corporation, Hearst Building, San Francisco, has taken over the sales end of the Moran Paint & Oil Company, manufacturer of preservative paints and compounds, and is now placing these products in international markets.

United States Pig-Iron Production, First Half 1916

The American Iron and Steel Institute, 61 Broadway, New York, has issued its special statistical bulletin No. 5 (1916), which gives the production of pig iron in this country in the first six months of the current year. The total output of all kinds of pig iron in this period was 19,619,522 gross tons, against 17,682,422 tons in the second half of 1915, and 12,233,791 tons in the first half of 1915. The figures show that the production in the first half of this year was 7,385,731 tons greater than in the corresponding period of last year. The details of the half year's output are as follows, compared with the two halves of 1915:

HALF-YEARLY OUTPUT OF PIG IRON BY STATES.

HALF-YEARLY PRODUCTION OF ALL KINDS OF PIG IRON.

States.	Blast furnaces. In blast Dec 31, 1915.	Blast furnaces. June 30, 1916. In.	Out.	Total.	Production—Gross tons. (Includes spiegeleisen, ferro-manganese, ferro-silicon, ferro-phosphorus, etc.) First half of 1915.	Second half of 1915.	First half of 1916.
Massachusetts	0	1	1	2	3,087	4,715	4,700
Connecticut	1	0	3	3			
New York	18	20	7	27	921,566	1,183,214	1,214,037
New Jersey	1	1	4	5			
Pennsylvania	125	132	25	157	5,199,421	7,591,247	8,286,076
Maryland	3	4	1	5	85,673	165,875	243,895
Virginia	7	9	12	21	105,244	146,102	202,777
Georgia	0	0	4	4			
Texas	0	0	2	2			
Alabama	27	31	16	47	868,341	1,181,112	1,366,728
West Virginia	3	4	0	4			
Kentucky	3	4	2	6	79,228	211,812	268,859
Mississippi	0	0	1	1			
Tennessee	6	12	6	18	82,992	94,737	162,009
Ohio	62	67	9	76	2,964,211	3,948,751	4,250,790
Illinois	21	23	1	24	801,951	1,645,269	1,938,152
Indiana	10	10	0	10	854,375	1,132,403	1,073,768
Michigan	11	12	2	14			
Wisconsin	7	6	2	8	130,514	242,452	417,542
Minnesota	2	3	0	3			
Missouri	1	1	1	2			
Colorado	2	4	2	6	137,188	134,733	190,189
Oregon	0	0	1	1			
Washington	0	0	0	0			
California	0	0	0	0			
Total	310	344	102	446	12,233,791	17,682,422	19,619,522

HALF-YEARLY PRODUCTION OF COKE PIG IRON.

New York	18	20	3	23	921,566	1,183,214	1,214,037
New Jersey	1	1	4	5			
Pennsylvania	118	124	15	139	5,155,120	7,547,217	8,205,199
Maryland	3	4	0	4	85,578	165,666	243,895
Virginia	7	9	10	19			
Georgia	0	0	2	2	105,244	146,102	202,777
Texas	0	0	1	1			
Alabama	26	29	14	43	853,445	1,169,054	1,346,460
West Virginia	3	4	0	4			
Kentucky	3	4	1	5	79,228	211,812	268,859
Tennessee	6	11	6	17	82,992	94,737	161,128
Ohio	62	67	8	75	2,964,007	3,948,089	4,250,790
Illinois	21	23	1	24	801,951	1,645,269	1,938,152
Indiana	10	10	0	10			
Michigan	2	3	0	3	851,084	1,182,146	1,150,384
Wisconsin	5	5	1	6			
Minnesota	2	3	0	3			
Missouri	0	0	1	1	161,593	180,294	366,274
Colorado	2	4	2	6			
California	0	0	0	0			
Total	289	321	69	390	12,061,808	17,473,500	19,347,935

ANTHRACITE AND MIXED ANTHRACITE AND COKE PIG IRON.

New York	0	0	3	3	42,487	42,266	79,591
Pennsylvania	4	6	7	13			
Total	4	6	10	16	42,487	42,266	79,591

HALF-YEARLY PRODUCTION OF CHARCOAL PIG IRON.

Massachusetts	0	1	1	2	3,087	4,715	4,700
Connecticut	1	0	3	3			
New York	0	0	1	1			
Pennsylvania	3	2	3	5	1,814	1,764	1,286
Maryland	0	0	1	1			
Virginia	0	0	2	2	95	309	
Alabama	1	2	2	4	14,896	12,058	20,268
Georgia	0	0	2	2			
Texas	0	0	1	1			
Kentucky	0	0	1	1			
Tennessee	0	1	0	1	204	662	881
Mississippi	0	0	1	1			
Ohio	0	0	1	1			
Michigan	9	9	2	11	98,856	118,946	132,637
Wisconsin	2	1	1	2			
Missouri	1	1	0	1			
Oregon	0	0	1	1	10,544	28,202	32,224
Washington	0	0	0	0			
California	0	0	0	0			
Total	17	17	23	40	129,496	166,656	191,996

TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

Coke	289	321	69	390	12,061,808	17,473,500	19,347,935
Anthracite*	4	6	10	16	42,487	42,266	79,591
Charcoal	17	17	23	40	129,496	166,656	191,996
Total	310	344	102	446	12,233,791	17,682,422	19,619,522

* Includes mixed anthracite and coke pig iron.

HALF-YEARLY OUTPUT OF PIG IRON BY GRADES.

HALF-YEARLY PRODUCTION OF BASIC PIG IRON.

States.	First half of 1915.	Second half of 1915.	First half of 1916.
New York, New Jersey	248,725	507,864	573,244
Pennsylvania—Allegheny County	1,468,844	2,111,503	2,309,777
" Other counties	1,421,826	2,133,191	2,578,396
Virginia, Alabama, Kentucky	315,133	467,879	501,225
Ohio	841,226	1,057,677	1,199,267
Indiana, Illinois	809,005	1,418,439	1,416,246
Michigan, Minn., Missouri, Colorado	154,855	137,047	251,930
Total	5,259,614	7,833,600	8,830,085

HALF-YEARLY PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS.

New York	170,149	187,635	223,456
Pennsylvania	1,749,755	2,598,342	2,566,539
Maryland	73,449	151,930	227,652
West Virginia, Kentucky, Tenn., Ala	70,214	194,378	236,182
Ohio	1,661,516	2,218,905	2,377,073
Illinois, Wisconsin, Colorado	513,504	933,529	1,208,275
Total	4,238,587	6,284,719	6,839,177

HALF-YEARLY PRODUCTION OF FOUNDRY PIG IRON.

Massachusetts, Connecticut	3,087	4,715	4,700
New York, New Jersey	426,023	369,271	331,651
Pennsylvania	405,199	486,968	559,767
Maryland, Virginia, West Virginia	103,409	135,615	192,454
Kentucky	17,328	8,310	43,151
Tennessee	69,558	71,339	132,264
Alabama	529,159	692,317	824,867
Ohio	300,764	419,606	465,106
Indiana, Illinois	65,960	76,370	91,742
Michigan	164,984	187,948	199,600
Wisconsin	77,482	145,078	165,155
Minnesota, Missouri, Colorado	44,422	59,436	75,953
Total	2,207,375	2,656,973	3,086,410

HALF-YEARLY PRODUCTION OF MALLEABLE PIG IRON.

New York	72,815	104,667	74,298
Pennsylvania	19,593	61,986	58,415
Kentucky, Ohio	102,136	207,250	139,682
Indiana, Illinois, Michigan, Wisconsin	83,968	177,506	188,444
Total	278,512	551,409	460,839

HALF-YEARLY PRODUCTION OF FORGE PIG IRON.

New York, New Jersey	3,438	4,307	6,780
Pennsylvania	62,074	94,388	54,807
Virginia	2,673	9,138	16,103
Tennessee, Kentucky	380	706	1,366
Alabama	16,425	16,716	19,570
Ohio	53,799	52,170	70,680
Total	138,789	177,425	169,306

HALF-YEARLY PRODUCTION OF SPIEGELEISEN AND FERRO-MANGANESE.

N.Y., Pa., Md., Ala., Ill., Colo., Wash., Cal.	90,310	136,647	189,046
Total	90,310	136,647	189,046

HALF-YEARLY PRODUCTION OF OTHER GRADES.

New York, New Jersey	416	4,470	2,108
Pennsylvania	4,766	8,128	8,586
Virginia, West Va., Tennessee, Alabama	9,920	20,556	27,984
Ohio	4,770	5,127	5,006
Indiana, Ill., Mich., Minn., Wis., Wash.	732	3,368	975
Total	20,604	41,649	44,659

PIG IRON MADE FOR SALE OR FOR USE OF MAKERS IN THE FIRST HALF OF 1916.

Grades.	For sale.	For maker's use.	Total Gross tons.
Basic	1,244,907	7,585,178	8,830,085
Bessemer and low phosphorus	801,592	6,037,585	6,839,177
Foundry, including ferro-silicon	3,037,646	48,764	3,086,410
Malleable	460,839	.....	460,839
Forge or mill	87,595	81,711	169,306
Ferro-manganese	23,510	76,441	99,951
Spiegeleisen	74,886	14,209	89,095
All other grades	29,410	15,249	44,659
Total	5,760,385	13,859,137	19,619,522

STRIKES AND SETTLEMENTS

Conditions at Milwaukee

MILWAUKEE, Aug. 15.—(*By Telegraph.*)—Between 60 and 70 union machinists of the Milwaukee Machine Tool Company were called out this morning, being the first walkout in the machinists' strike in five days. Of the Standard Separator Company's men 45 were called out Aug. 10. The inactivity of the strike leaders is arousing much comment, being taken as an indication of waning interest in the contest. A hurry call has been sent to William H. Johnson, Washington, president Machinists' International Union, to come here, and a mass meeting will be held in the Auditorium to-night to receive him. Serious disorder is absent, but nearly every day arrests are made on charges of assault and battery and disorderly conduct, many of which are dismissed for lack of cause.

The Illinois Fluorspar Strike About Over

CHICAGO, ILL., Aug. 15.—(*By Telegraph.*)—Vigorous action on the part of the towns people and authorities in dealing with the trouble-makers among the fluorspar miners has paved the way for an early resumption of shipments from the southern Illinois properties. The work of pumping out the mines was begun on Monday of this week, and with the departure of that element which has instigated the strike a speedy restoration of the previous operating conditions is expected.

More New England Trouble

The casting shops of the Waterbury Brass and the Benedict & Burnham branches of the American Brass Company, Waterbury, Conn., were closed Aug. 8 on account of a strike of casters' helpers. They demanded an increase in wages.

About 80 machinists and helpers at the plant of the Maxim Munitions Company, Derby, Conn., have quit work pending the adjustment of differences arising over the discharge of some of the night shift. Both sides claim that there is no strike.

There is renewed activity of the machinists' union in several cities, coincident with visits of national officers of the organization and there are threats of renewed demands for the 8-hr day.

Imports and Exports of Aluminum

Aluminum is the principal non-ferrous metal which still maintains its high war price level, being close to 60c. per pound. Decrease in imports has been an important factor. For the 11 months ended May 31, 1916, imports of crude and scrap aluminum were only 7,551,063 lb. as against 11,978,283 lb. and 14,868,574 lb. for the same periods of 1915 and 1914 respectively. In 1915 the imports were only 8,534,834 lb. as compared with 23,185,775 lb. in 1913.

Exports of aluminum and its manufactures on the contrary have decidedly increased. For the 11 months ended May 31, 1916, they were valued at $5,156,342 as against $2,994,476 and $1,040,686 in 1915 and 1914 respectively.

Personal reminiscences of the late James Mapes Dodge, chairman of the Link-Belt Company, by Charles Piez, president of the company, have been compiled in an attractive booklet. The author tells of the struggles, early failures and final successes of Mr. Dodge, and as the synopsis says "shows us the genial, charming personality of one who did much to shape our present day industrial ideals." One part is devoted to the development of the conveying and coal storage business and the other to Mr. Dodge's part in the Taylor system of management. The illustrations, some of them reproductions of early photographs, are interesting studies.

Hanging Rock furnace, at Ironton, Ohio, operated by Rogers, Brown & Co., blew out Aug. 7 for relining. It is expected to resume activity by Sept. 1.

An Iron Ore Fleet on the Hudson

An interesting development in connection with the movement of ore from the Port Henry district this season is that a number of shipments have been made by rail and water route. The New York & Western canal line has two fleets in this traffic, each consisting of a steam canaler and four consorts. The ore is loaded in the usual way into Delaware & Hudson cars at Witherbee, Sherman & Co's mines at Mineville, N. Y., and the initial rail haul is to Albany. Here the cars are run upon the Albany coal trestle and the ore, which is in drop-bottom cars, is unloaded into chutes from which it drops into the canal boats. These latter take it to Elizabethport, N. J., where it is unloaded into cars of the Central Railroad of New Jersey, going over this route into the Lehigh Valley. The canal boats, which are 98 ft. long, 17 ft. 6 in. beam and 11 ft. depth of hold, carry from 350 to 375 tons and the steamer 225 tons. The trip from Albany to Elizabethport and return requires about five days. About 10,000 tons a month is carried by the two fleets. Later in the season one or two experimental trips may be made from Whitehall, which is at the northern entrance to the new Champlain Canal, and it is possible a testing trip will be made this year from Port Henry to Elizabethport, all by water.

St. Louis Blast Furnace Started

The Mississippi Valley Iron Company, St. Louis, Mo., on Aug. 8, began the operation of its blast furnace. This is the rehabilitated and enlarged stack of the old St. Louis Blast Furnace Company. It is operating on ore from the Mesaba district and its capacity will be for the present about 300 tons of pig iron per day. Basic iron will be the principal product, though spiegeleisen and ferromanganese are being considered in plans for intermittent periods. The company controls about 285 acres of ore land near Waukon, Iowa, with an estimated ore supply of 10,000,000 tons, on which a concentrating plant is being equipped with a capacity of about 1000 tons per day. By the time this plant is in operation the company hopes to have barges, self-propelled, which it is building, ready for water transportation to the furnace which is located on the bank of the Mississippi. The plant at Waukon is under the superintendency of R. W. Erwin and that at St. Louis of Daniel Bontecou, Jr. The officers of the company are: Edward F. Goltra, president; Thomas S. Maffit, vice-president, and Jesse D. Dana, secretary and treasurer. The company is capitalized at $5,000,000.

Germany's Larger Pig-Iron Output

Germany's pig-iron output for June was 1,081,507 metric tons against 1,112,574 tons in May. The daily average in June was 36,050 tons, which is the highest for the war, the rate in May having been 35,890 tons per day. The June output was made up of 176,222 tons of foundry iron, 14,650 tons of Bessemer iron, 706,214 tons of Thomas iron, 167,171 tons of steel-making iron and spiegel and 17,250 tons of forge iron. The total production to July 1, 1916, was 6,497,032 tons against 5,534,333 tons to July 1, 1915. For the six months ended June 30, 1914, the output was 9,287,915 tons.

The Manitoba Steel Foundries, Ltd., McArthur Building, Winnipeg, Canada, states that its new foundry is nearing completion, and that one furnace will probably be in operation Sept. 1. The company will make electric steel, both in the form of castings and ingots for rolling, and when in full operation will have an annual capacity of 8000 to 10,000 tons. A. M. Tirbutt is secretary and treasurer.

The Munning-Loeb Company, Matawan, N. J., manufacturer of electroplating and polishing machinery and supplies, has opened an office in the Madison Terminal Building, 9 South Clinton Street, Chicago. All the business of the Middle West territory will be handled from this point and a stock of material will be carried. F. T. Taylor has charge of the office.

PERSONAL

Walter A. Barrows, Jr., of Brainerd, Minn., has been elected president and general manager of the Thomas Iron Company, Easton, Pa., to succeed Ralph H. Sweetser, whose resignation of several months ago becomes effective Aug. 31. Mr. Barrows has had an extended experience in blast-furnace and iron-mining work. Graduating from Rutgers College, New Brunswick, N. J., in 1886, he was engaged in the next ten years as chemist and pig-iron salesman for the Sharpsville, Claire, Leetonia and Mabel furnaces successively. He then became superintendent of the Hannah furnace of the Mahoning Valley Iron Company at Youngstown, Ohio. Later he had charge of furnaces at Sharpsville, Pa., and at Everett and Saxton, Pa. From 1901 to 1908 he was general manager of the furnaces and iron-ore properties of the Shenango Furnace Company (W. P. Snyder & Co.). Since 1908 he has been engaged in iron-ore exploration and development, consulting work in iron mining and in metallurgical practice.

Charles M. Schwab, chairman, and E. G. Grace, president, of the Bethlehem Steel Corporation, will be guests of honor at the annual meeting of the Chamber of Commerce of Harrisburg, Pa., Oct. 3.

C. K. Cairns, formerly in the sales department of the American Tool Works Company, Cincinnati, Ohio, has been appointed sales manager of the Cincinnati Pulley Machinery Company, Covington, Ky.

W. F. Rockwell has resigned his position as chief industrial engineer of Clinton H. Scovell & Co., Boston, to become assistant general manager in charge of manufacturing with the Torbensen Gear & Axle Company, Cleveland. As a consulting engineer, Mr. Rockwell has established a reputation in this country and Canada for efficiency work in manufacturing and power plants. He is also well known as a contributor to the technical press.

Charles R. Putnam, superintendent of the Waukegan plant of the American Steel & Wire Company, was seriously injured and his wife instantly killed as the result of their automobile being struck by an interurban car.

John I. Mange has been elected vice-president of the J. G. White Management Corporation, New York City. He has been associated with the corporation since 1912. Born in Pembroke, Maine, in 1876, Mr. Mange attended the public schools there and in Kingston, Mass., and was graduated in 1899 from Tufts College, with the degree of bachelor of science. He has been connected at various times with electric, electric light and other companies as chief electrician, electrical engineer or general manager.

The Merritt Mfg. Company, Lockport, N. Y., has elected the following officers: L. G. Merritt, president; H. M. Merritt, secretary; S. N. Neubecker, superintendent; A. R. Armer, draftsman; R. G. Morgan, sales manager.

Alfred J. Brooks, for years a draftsman at the old Roach shipyard, Chester, Pa., has been made superintendent of the Morse Shipbuilding Corporation, Noank, Conn.

E. W. Richey has been appointed assistant to President George E. Van Hagen of the Standard Forgings Company, Chicago.

A. C. Garrison, president; A. L. Johnson, vice-president and general manager; W. H. Kennedy, vice-president and treasurer; R. McCarty, secretary, and A. E. Lindau, manager of sales, are the officers of the Corrugated Bar Company, Mutual Life Building, Buffalo, under a reorganization which is effective Sept. 1.

Sydney S. Mowat is secretary to Vice-president and General Manager Ward B. Perley of the Canadian Steel Corporation, Ltd., at Ojibway, Ontario. It was incorrectly stated in a recent paragraph in this column that Raymond McLaughlin had gone from Youngstown, Ohio, to Ojibway to fill this position. Mr. McLaughlin is secretary at Ojibway to I. Lamont Hughes, general superintendent.

Carpenter Steel Company's New Officers

Robert E. Jennings, for 12 years president of the Carpenter Steel Company, Reading, Pa., has resigned his position in pursuance of his desire to retire from all industrial activities. For many years he was well known in the steel industry as the founder and active head of the Spaulding & Jennings Company, Jersey City, N. J. Upon its purchase by the Crucible Steel Company of America, Mr. Jennings became for a time vice-president of that company. Since his connection with the Carpenter Steel Company the production of alloy steels in the United States has had a phenomenal development. With this development Mr. Jennings has been closely identified, his company being among the leaders in the manufacture of this class of material. He will remain a director of the Carpenter Steel Company, but with his retirement as president the company announces the election of the following officers:

W. B. Kunhardt, president; F. A. Bigelow, vice-president and general sales manager; J. H. Parker, vice-president and metallurgist; J. S. Pendleton, treasurer; W. D. O'Gorman, secretary. Mr. Kunhardt, the new president, has long filled the position of treasurer of the company but has taken an active part in its management.

New England Foundrymen at Pomham Club

The annual midsummer outing of the New England Foundrymen's Association took place Aug. 9 at the Pomham Club on the shore of Narragansett Bay, R. I. Members and guests to the number of 120 participated in the entertainment provided. The Providence members were the hosts, and the committee of arrangements consisted of Henry A. Carpenter, William A. Viall and A. J. Miller. A program speckled with humorous drawings set forth the troubles of the committee in the selection of sports and recited that the Roman Circensian games first selected were abandoned because of their immoral and brutal character and the suggested Clan-Na-Gael games of Scotland had to be given up because the appropriation was not large enough to permit of sufficient liquid stimulation for such performances. At a short business meeting three new members were added to the membership roll. During the dinner an orchestra, a quartet and an impromptu contest between a professional and several amateur entertainers enlivened the waits between courses.

Ingot Molds Lined with Steel

Lining ingot molds with steel is the suggestion offered by Harry E. Sheldon of Pittsburgh in a patent (U. S. 1,185,252—May 30, 1916). He claims to prolong the life of the mold and to insure a steel uncontaminated by impurities from the cast iron of the mold. The steel inner surface of the mold is recommended to be of the same carbon content as that of the molten steel to be cast in it. Details of the formation of the molds are given in the patent.

The H. H. Franklin Mfg. Company, Syracuse, N. Y., has placed a further order for a battery of 12 Gehnrich indirect heated radiator type ovens with the Gehnrich Indirect Heat Oven Company, 60-62 Franklin Avenue, Brooklyn, N. Y. This order duplicates the Gehnrich ovens installed in the same plant a year ago.

Jefferson furnace, at Oak Hill, Ohio, owned by the Jefferson Iron Company, blew in Aug. 9, making charcoal pig iron. This is one of the oldest furnaces in Ohio, having begun operations in 1853, but it has been idle in recent years. Its capacity is 12 tons a day.

The Kelly & Jones Company, Greensburg, Pa., manufacturer of cast-iron, malleable, brass and steel valves, fittings, cocks, etc., poured the first castings in its new steel foundry on July 22.

Pittsburgh and Nearby Districts

John O. Pew, president Youngstown Iron & Steel Company, after going over the steel works of the corporation at Lowellville, Ohio, with the insurance adjusters, states that the loss from the fire on the night of Aug. 11 will not be more than $8,000 to $9,000. The greatest damage was done to electric wiring and accessories, which compelled the management to close down the rolling-mill department for the first part of this week. The steel-making department continued in operation, not being damaged in the least. The board of directors of the company has organized by the election of the following officers: President and general manager, John O. Pew; first vice-president, Henry W. Heedy; second vice-president and secretary, C. A. Cochran.

Employees of the Youngstown Sheet & Tube Company, Youngstown, Ohio, will hold their annual outing at Southern Park Sept. 4, Labor Day. J. M. Woltz, safety director, is chairman of the arrangement committee. There will be band concerts, native folk dancing by Servian, Hungarian, Roumanian and Austrian teams, prizes for various games, etc.

The offices of the Garland Nut & Rivet Company have been removed from Pittsburgh to West Pittsburgh, Lawrence County, Pa.

The American Steel Foundries will build two new open-hearth furnaces at its works at Sharon, Pa., which will nearly double the output of steel ingots. Work on the first furnace will be started within 30 days and on the second soon after. The plant is now turning out steel ingots almost exclusively. These are to be converted into shells for the Allies. Improvements are also to be made at the Franklin plant.

The American Brake Shoe & Foundry Company has awarded contract to the Austin Company, Cleveland, for a one-story building, 75 x 800 ft., to be erected at Twelfth and Payne Streets, Erie, Pa., at a cost of about $80,000.

A check for $500 for the endowment fund of the National McKinley Birthplace Memorial Association has been received by President J. G. Butler, Jr., Youngstown, from the John A. Roebling's Sons Company, Trenton, N. J.

Cost System for Manufacturers

The Federal Trade Commission, Washington, D. C., has issued, for general distribution, a pamphlet of 31 pages entitled "Fundamentals of a Cost System for Manufacturers," which sets forth a system by which costs of manufacture can be determined. This is intended for the use of manufacturers, particularly the smaller ones, who have no adequate system for determining the cost of their products, and who, therefore, price them arbitrarily. An introductory note by Edward N. Hurley, chairman of the commission, states that it is evident that there must be improvement in this direction before competition can be placed upon a sound economic basis.

The Roanoke Steel Company, Inc., Roanoke, Va., has been organized to succeed the Louks Iron & Steel Company. After a few minor repairs have been made, the plant will be ready for operation, probably within the coming week. The company will specialize on high grade merchant iron bars and rerolled rails. The equipment consists of 30 double puddling furnaces, a 20-in. muck bar mill, one 18-in. and one 12-in. finishing mill, one rerolling rail mill and a machine shop. John Robinson is president and general manager, and W. L. Jack is secretary-treasurer.

A tin-concentrating and smelting plant for the An-Yuan mines in Hunan Province, southern China, is shortly to be placed in commission by the Wah Chang Mining & Smelting Company, Ltd., which will offer the product for sale in New York (offices in the Woolworth Building) and through agencies in Europe. These mines are in the Ichanghsien district and contain both oxide and sulphide ores.

OBITUARY

RALPH D. WILLIAMS, editor of the *Marine Review*, Cleveland, from 1900 to 1915, died Aug. 14, aged 48 years. He was born at Nottingham, Eng., and when he was about 10 years old his family removed to Cleveland. He was successively reporter on the Cleveland *Plain Dealer*, city editor, managing editor and Washington correspondent, resigning in 1900 to become editor of the *Marine Review*. Ill health compelled his retirement in June, 1915. He was an authority on statistics and history of the Great Lakes trade, and much of this information he embodied in a biographical book, "The Honorable Peter White," published in 1907, a real contribution to the history of the Lake Superior iron ore region.

GEORGE M. NASH died July 28 at Newton, Mass., aged 62 years. He was born in Abington, Mass., and was graduated from Harvard College in 1877. For a few years he taught school in Cleveland, and, returning to Massachusetts, he engaged in business with the Lamb & Ritchie Company, Cambridgeport, Mass. Two years ago, with one of his partners, he established the Lamb & Nash Company, for the manufacture of sheet metal machinery and sheet metal goods. He leaves his widow, three sons and one daughter. One of his sons, Russell K., was engaged in business with his father.

Another Large Elevator for Buffalo

Buffalo's grain-handling facilities are to be increased by the construction of a new 2,500,000-bu. elevator, with three legs for vessel unloading and fast shipping legs for railroad cars and canal boats. It will be located on the Buffalo River, adjacent to the grain terminal yards of the New York Central Railroad, and adjoining the present 2,000,000-bu. elevator of the Eastern Grain, Mill & Elevator Corporation. It will be built by the Central Elevator Corporation, a recently incorporated auxiliary of the Eastern Grain, Mill & Elevator Corporation, of which Nisbet Grammer is president, and will be operated in connection with the elevator of the latter company, giving a total grain storage capacity of 4,500,000 bu., an unloading capacity of more than 1,000,000 bu. a day and a railroad and canal loading capacity of equal amount. Contract for the construction has been let to the Monarch Engineering Company, Buffalo. The entire elevator is expected to be ready for use in August, 1917, when the heavy fall movement of grain usually begins.

Structural Business in July

The records of the Bridge Builders' and Structural Society, as collected by its secretary, George E. Gifford, 50 Church Street, New York, show that in July 47½ per cent of the entire capacity of the bridge and structural shops of the country was put under contract. This indicates that about 82 000 tons of fabricated steel work was awarded in July against about 100,000 tons in June, which month, incidentally, was the leanest in new fabricated projects since February, 1915.

The August number of the *Modern Hospital*, published at St. Louis, is devoted to a symposium on welfare work among the industrial corporations of the country, including papers written by welfare directors in some of the most important industrial corporations. Among the topics discussed are first aid, industrial nursing, lunches and diets for industrial employees, safety devices in factories, and athletic and social clubs for employees. Dr. Thomas Darlington, in charge of welfare work of the American Iron and Steel Institute, discusses the present scope of such work in the iron and steel industries.

The Chamber of Commerce of Frankfort, Ky., will shortly undertake an industrial survey and will then begin a campaign for new manufacturing establishments.

Machinery Markets and News of the Works

BRISK BUYING CONTINUES

Slight Improvement in Deliveries a Help

Many Small Lots of Standard Tools Bought—Rebuilt Lathes Readily Sold—Canada Spends a Million a Day for Munitions

The aggregate of purchases of machine tools is maintained at its recent high level by the closing of orders for additional equipment needed to handle the new shell orders, as well as by a uniformly strong demand for a few standard tools from all classes of shops the country over. A slight improvement in deliveries has been of assistance in keeping up the demand from the general industrial field.

For handling its contract for 9.2-in. shells the American Brake Shoe & Foundry Company has ordered a lot of large engine lathes, and has taken a number of small turret lathes for making nose pieces and base plugs. Inquiries before the trade include machines for manufacturing shells of from 6 in. to 12 in. caliber.

Large appropriations are also being used in adding to the United States arsenals, notably at Watervliet, N. Y., where $680,000 is being spent to increase the machine shops.

Factory expansion everywhere is, however, the backbone of the machine-tool trade. Each day adds to the list of expanding manufacturers, whose plants are growing apace.

In Michigan automobile makers continue to consolidate and expand their factories by additions that follow in many cases one right after the other. The Fisher Body Corporation of Detroit has been formed to take over the Fisher Body Company and allied interests with an initial estimated capital of $10,000,000. In the East the Emerson Motors Company has let contracts for the first of ten units of a plant to be erected at Long Island City, N. Y., at a cost of about $2,500,000; and the Edward G. Budd Mfg. Company of Philadelphia has arranged to add three more buildings to its automobile body works.

The recently-organized Moore Steam Turbine Corporation of Wellsville, N. Y., is placing orders for machine-tool and power-plant needs amounting to close to $35,000.

The Canadian war account now amounts to about $1,000,000 a day, and may continue indefinitely. Business flourishes nevertheless in the Dominion, new operations running to large figures appearing nearly every week.

New York

NEW YORK, Aug. 16, 1916.

Orders for large engine lathes have been placed by the American Brake Shoe & Foundry Company for the execution of its contract for 9.2-in. shells. The company also bought a number of small turret lathes for making nose pieces and base plugs. A tentative inquiry before the trade calls for machines for turning out 12-in. shells, and other business of the same character is pending. Altogether, the amount of business brought out by the recent orders for 6 to 12-in. shells has reached large proportions, but its aggregate is difficult to gage for the reason that all concerned seem adverse to publicity.

Russian buyers, including the Russo-Baltic Car Works, 1 Madison Avenue, New York, have been eagerly contracting of late for machine tools which can be delivered before October 15. A ship scheduled to sail on that date is the last which, it is believed, can reach Archangel, Russia, before that harbor is closed by ice for the season.

From the general industrial field there is a good steady demand, which is helped by a slight improvement in deliveries, although standard machines are still a considerable distance off in many caes, and there is frequent mention of sales being lost because tools cannot be delivered when wanted.

The General Electric Company has been a liberal buyer for its various plants.

The Emerson Motors Company has awarded contract for a factory to be completed within four months at an estimated cost of $250,000. It is to be located at Orton Street and Borden Avenue, Long Island City, N. Y., and will cover two blocks. The building is to be the first unit, and is planned to produce 100 motor cars per day. At the same time additional space has been provided adjoining this first building for ten similar units to produce when completed 1000 automobiles every 24 hr. The total final cost of the 10 units, it is stated, will be $2,500,000.

Important additions will be made to the Government Arsenal at Watervliet, N. Y., including additions to the machine shop and the installation of new machine tools for which a total appropriation of $680,000 has been made. A grant has been made also for the construction of an assembly shop and powder plant for the arsenal at Dover, N. J.

The General Optical Company, 538 First Avenue, New York, has purchased the plant of the Max Ams, Inc., Mount Vernon, N. Y., which was vacated by that company when it removed to its new plant in Bridgeport. The purchaser will make extensive alterations, expending about $50,000, and will remove its plants at New York and Toledo, Ohio, to this plant. About 500 employees will be engaged.

The city commissioners, Bayonne, N. J., are working on a plant for the city to join in partnership with the Bush Terminal Company, 100 Broad Street, New York, in the carrying out of a plan to construct steamship and rail terminals covering a site of about 420 acres on New York Bay; but before any definite action is taken the citizens will express their opinion at a referendum election.

The Empire Axle Company, maker of worm drive axles, Dunkirk, N. Y., has purchased 3¼ acres at Buffalo on Lamphere Street, adjoining the Nickel Plate, Pennsylvania, New York Central and Buffalo & Lake Erie Traction Company lines. It has let contracts for a building, 80 x 100 ft., for assembling and machining worm-drive axles, etc., with leanto for furnaces. O. F. Baker is president.

The Standard Aero Corporation, Plainfield, N. J., has awarded contract to the Anchor Corrugating Construction Company, 140 Washington Street, New York, for a one-story machine shop, 65 x 160 ft.

Due to increasing demand the Binghamton Light, Heat & Power Company has recently purchased about 20 acres, bordering the Susquehanna River, near Johnson City, N. Y., adjacent to the Lackawanna Railroad, upon which it will erect a new power plant, 60 x 80 ft., of brick. It will be equipped with machinery capable of supplying the needs of the City of Binghamton. The initial capacity will be 7500 hp., with provision for greater capacty, as requirements may demand. W. S. Barstow & Co., Inc., 50 Pine Street, New York, is the contractor. The equipment has been purchased.

The Samuel L. Moore Sons Corporation, Elizabeth, N. J., has had plans completed for carpenter shop, powerhouse and office building, 50 x 75 ft., two stories, and 60 x 140 ft., one story. The architect and engineer, the Ring, Cleaves, Graham Company, 280 North Broad Street, Elizabeth, is about to take bids.

The Hunter Car Sign Company, Flushing, N. Y., has let contract for the construction of a one-story addition 85 ft. square to cost about $10,000.

The Cataract Refining & Mfg. Company, Marine National Bank Building, Buffalo, N. Y., has awarded contract for a one-story cooper shop, 32 x 70 ft., to cost about $3,500.

The Carborundum Company, Niagara Falls, N. Y., has awarded contract to the Turner Construction Company, 11 Broadway, New York, for the erection of a grading and crushing building, four stories, 54 x 166 ft.

The F. J. Rooney Lamp Company, Fourteenth Street and Willow Avenue, Hoboken, N. J., has let contract for a three-story frame addition, 30 x 70 ft., estimated to cost $10,000.

The Driver-Harris Wire Company, Middlesex Street, Harrison, N. J., has awarded contract for the construction of an annealing house to cost $5,000. The F. A. Ogden Company, Newark, N. J., is the engineer.

The Schaeffer & Budenberg Mfg. Company, Berry and South Fifth streets, Brooklyn, N. Y., is in the market for a Pratt & Whitney No. 1 two-spindle gun barrel drilling machine.

The Jay Street Terminal, 71 Water Street, New York, is seeking a 45-ton electric trolley locomotive.

Claudius Ash Sons & Co., 1 Union Square, New York, makers of dental supplies, have let contract to the William H. Connolly Company, 295 Twelfth Street, Newark, N. J., for the erection of a one-story factory at a reported cost of $85,000.

The American Concrete Steel Company, Essex Building, Newark, N. J., has been awarded contract by Thomas A. Edison, Inc., West Orange, N. J., for the construction of a two-story and basement factory, 80 x 220 ft., to cost about $75,000.

The LeRoy Salt Company, Leroy, N. Y., is having plans prepared for a one-story engine room, 32 x 65 ft., to cost about $8,000.

The Carle Motor Parts Company, Buffalo, N. Y., has filed incorporation papers to manufacture motors and engines for automobiles and motor trucks. Harold Carle, 652 Humboldt Parkway, Arthur L. Dixon and Joseph F. Meha, all of Buffalo, are the incorporators.

The Multi-Machine Company, Buffalo, capitalized at $50,000, has been incorporated to manufacture special tools, machines, engines, boilers, and supplies. A. E. Davenport, H. J. Ernst, 1056 Ellicott Street, and W. E. Gieckel are the incorporators.

Incorporation papers have been filed by the Syracuse Forging & Machine Works, Syracuse, H. F. Butler, F. M. Hennesey and C. H. Goebel, Syracuse, directors, to do a forging and foundry business. The company is capitalized at $550,000.

The Standard Furniture Company, Herkimer, N. Y., has let contract for erection of a powerhouse, 50 ft. square, one story.

S. Lichtman, Buffalo, has purchased the building formerly occupied by the Niagara Machine & Tool Company at Superior and Randall streets, 55 x 135 ft., four stories, and will remodel and equip it for handling scrap metals.

The Magnus Beck Brewing Company, Buffalo, has let contract for a cooperage plant adjoining its brewery on North Division Street.

The Peerless Husker Company, 82 The Terrace, Buffalo, has purchased the factory of the Lunan Metal Enamelling Company at Cornwall Avenue and the Erie Railroad, and will equip it for the manufacture of corn-huskers and other farm implements.

New England

BOSTON, MASS., Aug. 14, 1916.

While no diminution in production is yet apparent, many machine-tool builders are reporting a decided slackening in orders. Some plants are filled with orders which will keep them busy for many months; but foundries are reporting that they are in receipt of instructions not to rush orders which they have in hand for machine-tool castings. Several machine shops are beginning to let some of their least competent help go and it is believed that in another month or two this action will become quite general.

Two weeks of embargo on incoming freight on the New Haven Lines has caused some bother, but this condition was relieved when freight was again moved on Aug. 11. An embargo on export goods for New York harbor points is in force except where steamer space has been engaged.

The Philbrick-Booth Foundry Company, Hartford, Conn., has filed a certificate of organization with authorized capital of $15,000. The directors are Halsey R. Philbrook, Hartford, president; H. R. Philbrook, Hartford, secretary and treasurer; Thomas T. Booth, Worcester, Mass., vice-president; and F. T. Williams, Worcester. The company is building a foundry on Homestead Avenue, Hartford.

The American Brass Company, Waterbury, Conn., has been granted permits for the erection of four buildings on Crane and Freight streets; 111 x 203 ft., 22 x 57 ft., 105 x 110 ft. and 35 x 37 ft.

Appropriations have been granted for the erection of new buildings at the Government Arsenal, Watertown, Mass., as follows: Gun carriage manufacturing building to cost $500,000; projectile machine shop to cost $215,000, and power plant to cost $12,000.

The Progressive Tool Equipment Company, New Haven, Conn., has been incorporated with capital stock of $50,000 to do a general machine shop and manufacturing business. The corporators are Kent L. Bradley, New Haven; Robert H. Chirgwin, Shelton, and Harry B. Thomson, New Haven.

The Bantam Anti-Friction Company, Bantam, Conn., has awarded the contract for an addition, 50 x 100 ft., three stories.

The Southington Hardware Company, Southington, Conn., has awarded a contract for the erection of two one-story additions, 40 x 144 ft. and 40 x 120 ft.

Work has been started on an addition, 25 x 101 ft., to the plant of the American Pin Company, Waterville, Conn.

The Metal Specialty Company, Waterbury, Conn., has placed a contract for a building, 98 x 170 ft., one story, to be erected on East Aurora Street.

The American Graphophone Company, Bridgeport, Conn., has begun the erection on Summerfield Avenue of a powerhouse, 80 x 87 ft., with an ell, 15 x 23 ft.

The American Chain Company, Bridgeport, Conn., has awarded a contract for an addition to its plant on Connecticut Avenue.

The American Brass Company has awarded a contract for an addition, 60 x 300 ft., one story, to its Ansonia Brass & Copper Company plant at Ansonia, Conn.

The Advance Machine Company, Boston, Mass., has been incorporated with capital stock of $150,000 to manufacture type and die-embossing machines. The directors are William E. Choate, president; Frederick Somes, 31 Ames Street, Cambridge, treasurer; and J. W. Morton.

Philadelphia

PHILADELPHIA, PA., Aug. 14, 1916.

The Edward G. Budd Mfg. Company, manufacturer of sheet-metal shapes, automobile bodies, etc., Twenty-fifth Street and Hunting Park Avenue, Philadelphia, has purchased a site at Wissahickon and Hunting Park avenues, 405 x 700 ft., and is having plans drawn for the erection of brick and reinforced-concrete buildings; 75 x 300 ft., five stories; 125 x 310 ft., one story and 85 x 300 ft., one story. Ballanger & Perrot, 1701 Arch Street, Philadelphia, are the architects.

The recent report that the Christian Machine Works, owned by Charles Bond, 520 Arch Street, Philadelphia, is to be enlarged, is untrue. The company states that it does not contemplate any changes, although the plant is fairly busy.

The McCaa Radio Company, Lancaster, Pa., is now perfecting a manufacturing organization which will establish a plant there for the manufacture of wireless telegraph apparatus. D. G. McCaa is in charge.

The Pottstown Machine Company, Pottstown, Pa., manufacturer of special automatic machinery for tapping and threading pipe fittings, is erecting an office building, 36 x 40 ft. The company has built 195 heavy-duty lathes for an Eddystone munition maker, and is building six for another company, all weighing about 9000 lb. each. Recent orders for its tapping machines includes one for Scotland.

The Champion Blower & Forge Company, Lancaster, Pa., manufacturer of blowing, thread-cutting, forging and other machinery, has acquired several acres adjoining its plant and plans to erect an addition. H. P. Keiper is president.

The Allen Street Sweeper & Auto Company, Allentown, Pa., will open a plant this month for the manufacture of motor trucks and street-cleaning machines, the latter employing a vacuum device. Howard S. F. Barner, 1421 Munroe Street, Allentown, general manager, was connected for 12 years with the Mack Brothers motor car manufacturing business at Allentown.

The Empire Brass Company, Stroudsburg, Pa., advises that it will not rebuild its three buildings which were destroyed by fire Aug. 1 with a loss of about $100,000, inasmuch as the lessee, the Cameron Engineering Company, has removed to another location.

The Pennsylvania Equipment Company, 303 Coleman Building, Philadelphia, is in the market for a 15-ton standard gage locomotive crane, with 40-ft. boom, preferably 8 wheels.

With $75,000 capital stock John Roach & Co., Inc., Bridgeport, Pa., has been incorporated to conduct a general foundry and iron and steel manufacturing business. The incorporators are Joseph H. Roach, Brookline; B. F. Evans and Joseph C. Laird, Norristown, and B. C. Trimble, Philadelphia.

The new buildings of the Congoleum Company, Marcus Hook, Pa., are nearing completion. It is said that when

they are in operation the output of the company will be increased about 25 per cent.

The Common Council, Reading, Pa., authorized Aug. 11 the vacating of four streets to provide a tract of land for the International Money Machine Company, Terre Haute, Ind., which will move its plant to Reading. All of the proposed factory buildings will be only one story, requiring a large site.

The Vacuum Oil Company, 61 Broadway, New York, is taking bids for a one-story powerhouse, 100 x 115 ft., to be erected at Paulsboro, N. J.

The Reading Steel Casting Company, Reading, Pa., is reported to be taking bids through its engineers, William H. Dechant & Son, Reading, for a one-story foundry addition, 60 x 220 ft.

The Electric Storage Battery Company, Philadelphia, has awarded contract for a one and two-story manufacturing building, 100 x 220 ft., to cost $45,000.

The Easton Machinery Company, Drake Building, Easton, Pa., is in the market for high-pressure water-tube or horizontal return-tubular boilers.

The Keystone Equipment Company, Philadelphia, has been incorporated with a capital stock of $5,000 by Augustus C. Buzby, Harold A. Buzby, Warren F. Buzby, Morgan R. Shafer and Victor F. Shafer, to manufacture machinery, specialties and lubricating devices.

The Luster-Jordan Company, Philadelphia, has been incorporated with a capital stock of $25,000 by Fred J. Lynch, Jr., Mongolia, Pa.; William E. Blair, Philadelphia, and Fletcher W. Stitler, Nazareth, Pa., to manufacture machinery, tools and appliances. C. H. Stoer, 4615 North Broad Street, Philadelphia, is treasurer.

The Pennsylvania Gage & Tool Company, Bellevue Court Building, Philadelphia, has been incorporated with a capital stock of $10,000 by Max A. Sherrett, James S. Aber and C. H. Stoer, 4615 North Broad Street, to manufacture tools, machinery and appliances.

The Mifflin Chemical Corporation, Philadelphia, has been incorporated with a capital stock of $100,000 by David Berg, 1715 Jefferson Street, Philadelphia, and others, to manufacture chemicals.

The Elgin Sales & Service Company, Philadelphia, has been incorporated with a capital stock of $30,000 by William Folwell Yerkes, Jenkintown, Pa., L. Peters Merritt and Samuel Webb, Forty-sixth and Walnut streets, Philadelphia, to operate a garage and repair shop.

The Herbert Cook Company, Philadelphia, has been incorporated with a capital stock of $10,000 by William P. Herbert, Bala, and Ralph W. Cook, Hamilton Court, Philadelphia, and Nathan G. Herbert, Somerton, Pa., to manufacture automobile accessories.

The Rishel Phonograph Company, Williamsport, Pa., has been incorporated with a capital stock of $10,000 by John K. Rishel, Ralph T. Smith, Benjamin H. Hamner, and the J. K. Rishel Furniture Company, Williamsport, Pa., to manufacture musical instruments.

The Bloch Go-Cart Company, Philadelphia, has been incorporated with a capital stock of $5,000, by Lester M. Bloch, 1633 North Thirty-third Street; Gustav L. Bloch, Glenside, Pa., and Augustus R. Lamplugh, 5113 North Thirty-third Street, to manufacture go-carts and other small vehicles.

The Lanz Jewelry Company, Norristown, Pa., capital stock of $40,000, has been incorporated by Elizabeth Lanz, 725 W. Marshall Street, Norristown, Pa.; Gustav Lanz, 638 Stanbridge Street, Norristown, and Ralph L. Lanz, 131 Stanbridge Street, Norristown, to manufacture jewelry.

The Mee-Tu Tire & Rubber Company, Chester, Pa., capital stock of $5,000, has been incorporated by Thomas G. Meeley, 5000 Pine St., Philadelphia; George G. Meeley, 5000 Pine Street, Philadelphia, and Lester W. Weaver, 5447 Lansdowne Avenue, Philadelphia, to deal in junk.

Indianapolis

INDIANAPOLIS, IND., Aug. 14, 1916.

The Teetor-Hartley Motor Car Company, Hagerstown, Ind., is building an addition of brick and steel, 32 x 135 ft., adding about 8640 sq. ft. of floor space, which it plans to have completed about Oct. 1, at a cost of $12,000. It will install machinery to cost $10,000, and will add 50 more employees. It plans to double its output of motors, producing about 20 per day. John H. Teetor is president.

The West Liberty Milk Condensing Company, Goshen, Ind., has been incorporated with a capital stock of $50,000. It plans to start the construction of a factory about Sept. 1, and desires to get in touch with manufacturers of building materials, machinery, etc. Edward W. Neidig is manager.

The Indiana Tank & Boiler Works, Indianapolis, Ind., has taken over the business of the National Boiler & Sheet Iron Works. J. E. Bossingham is manager of the new company.

The Metzger & Wright Machine Shop, Lafayette, Ind., will remove from its present location to a building on South Third Street, which will be remodeled and in which new machinery will be installed.

The Ross Machine Company, Lafayette, Ind., will erect a factory building.

The Universal Tool & Die Company, Indianapolis, Ind., has been incorporated with a capital of $10,000 by Charles J. McHugh, Edward W. Hohlt and Durward Rivers. It will manufacture castings, machinery and dies.

The Nordyke & Marmon Company, Morris Street and Kentucky Avenue, Indianapolis, Ind., has taken out a permit for an addition to its plant, 225 x 600 ft., one story, to cost about $30,000. It has completed two other buildings, 200 x 400 ft. and 100 x 200 ft.

The Haynes Automobile Company, Kokomo, Ind., has increased its capital stock from $1,400,000 to $4,000,000.

The Globe Accessories Company, Greensburg, Ind., has been incorporated with $100,000 capital stock to manufacture household specialties, and auto accessories. The directors are J. W. Judkins, R. E. Edwards and L. W. Gillespie.

The Harold King Wrench Company, Indianapolis, has been incorporated with $50,000 capital stock to manufacture wrenches and other tools. Harold King, H. King and M. King are the directors.

The Meadows-Jones Mfg. Company, Indianapolis, has been incorporated with $50,000 capital stock to manufacture floor clamps. The directors are Harvey M. Meadows, J. H. Jones and Wm. H. Simmons.

The Terre Haute Paper Company, Terre Haute, Ind., will build an additional plant, to cost $300,000. Edward B. Weston, Dayton, is president.

The Indianapolis Drop Forging Company, Indianapolis, has increased its common stock from $95,000 to $160,000 and preferred stock from $160,000 to $210,000.

The Frankfort Handle Mfg. Company, Frankfort, Ind., has filed preliminary articles of dissolution.

The Wabash Basket Company, Wabash, Ind., has been incorporated with $50,000 capital stock to manufacture baskets and other ware. The directors are W. B., Isadore E. and Abraham Loewenberg.

The American Public Utilities Company will make improvements to the plant of the Danville Heat, Light & Power Company, Danville, Ind., which it recently purchased.

The Michigan City Ice & Cold Storage Company, Michigan City, Ind., has increased its capital stock from $150,000 to $200,000.

The Gas Oil Company of Hammond, Ind., has been incorporated with $25,000 capital stock to manufacture drip oil holders, etc. The directors are Edward G. Pratt, W. D. Patton and H. M. Curtis.

The American Wood Register Company, Plymouth, Ind., has been incorporated with $10,000 capital stock to manufacture novelties and specialties. The directors are J. C. M. Keith, Chas. J. Scott and C. B. Halloday.

Chicago

CHICAGO, ILL., Aug. 14, 1916.

The Western Electric Company, Hawthorne, Ill., will erect a one-story factory addition, 75 x 168 ft. The company's engineer and superintendent of construction, C. Barnes, is taking bids.

Wheaton, Ill., has taken bids for the erection of a one-story pumping station, 50 x 90 ft., from plans by Paul F. Olsen, 127 North Dearborn Street, Chicago. L. Ellsworth is city clerk.

The Chicago, Burlington & Quincy Railroad is having plans prepared for an addition to its repair shop at Beardstown, Ill. T. E. Colbert, 547 West Jackson Boulevard, Chicago, is chief engineer.

The Sanitary District of Chicago, 910 South Michigan Avenue, Chicago, has completed plans and will take bids shortly for a pumping station to be erected near Wildwood, Ill., at an estimated cost of $2,000,000. Thomas A. Smyth is president of the board.

The Midland Metal Company, 1259 Campbell Avenue, Chicago, will build a one-story brick factory at 1269-73 South Campbell Avenue to cost $12,000.

The Hughes Electric Heating Company, Chicago, will erect a factory building at Taylor Street and Waller Avenue to cost $150,000.

The Cribben & Sexton Company, stove manufacturer, Chicago, has awarded contracts for a one-story plant extension, 100 x 102 ft., to cost $18,000.

W. Gibbons Uffendell, architect, 39 South State Street,

Chicago, has taken bids for factory extensions to cost $50,000, including a forge shop addition, 49 x 71 ft.

Henry A. F. Lueders, 2212 Sunnyside Avenue, Chicago, will build a one-story garage and machine shop, 36 x 131 ft.

The Centaur Motor Company, Wabash Avenue and Twenty-ninth Street, Chicago, will erect a service building and machine shop, 80 x 150 ft., to cost $60,000.

The Illinois Steel Company, Chicago, is about to erect a large extension to its machine shop at its Gary Works.

The New York Central Railway Company will erect a new air compressor building at its Root Street yards at Chicago. H. W. Fenno, 402 La Salle Street Station, is the architect.

The plant of the Fitz Hugh-Luther Company at Hammond, Ind., has been purchased by the Railway Motor Car Company of America, 110 South Dearborn Street, Chicago, and will be operated for the manufacture of gasoline motor propelled passenger cars. The company expects to purchase $20,000 worth of machinery.

The International India Rubber Mfg. Company, a million dollar corporation recently organized, will build a factory at South Bend, Ind.

The Brown Portable Elevator Company, North Chicago, Ill., will build an addition to its plant which will double its present floor space.

The Holt Mfg. Company, East Peoria, Ill., will erect a one-story foundry building, 116 x 250 ft., in addition to the machine shop now being built. The company manufactures tractors.

The E. M. Smith Company, machinist, Peoria, Ill., is building an addition to its plant.

The Orbon Stove & Range Company, Belleville, Ill., will build an addition to its foundry to cost $1,230.

The Strickler Mfg. Company, manufacturer of automatic self-binding hay balers, Keokuk, Iowa, may be in the market shortly for equipment for manufacturing its product. It is in the market for a second-hand milling machine, shaping machine, drilling machine, lathes, etc., available in the Central West.

Cincinnati

CINCINNATI, OHIO, August 14, 1916.

Second-hand machinery dealers report that they are having little trouble in disposing of rebuilt machine tools, especially the larger sizes of lathes. The break in the extremely hot weather that has prevailed in the Central West for some time has improved shop production to a considerable extent. Scattered orders for new machine tools continue to come in at a satisfactory rate, but large lists are absent. Railroad buying has been cut off, due, it is stated, to the impending strike. It is also said that many manufacturers are holding up purchases of machinery of all kinds pending the settlement of this serious labor trouble.

Makers of sugar machinery will probably be able to report one of the biggest year's business in the history of their organizations. A number of large contracts are under way, most of which business is from Cuba. Portable electric drilling machine manufacturers are somewhat handicapped in getting material on time. Both the domestic and export demand for these machines is very good.

The large addition to the plant of the Elmwood Castings Company, Elmwood Place, Cincinnati, has been completed and practically all of the equipment installed.

It is reported that the Cincinnati Home Brewing Company, Cincinnati, is having plans prepared for an addition to its plant in West End, for which refrigerating equipment will be required.

Plans for the new refrigerating and cold-storage plant of the Frenche Brothers Bauer Company, Cincinnati, have now been completed. The building will be 126 x 225 ft., four stories and basement, of brick and steel.

The Springer-Wood Company, Cincinnati, has been incorporated with $200,000 capital stock to erect refrigerating plants. H. C. Wood and M. E. Springer are the principal incorporators. Nothing is yet known as to the company's manufacturing plans.

The Recording & Computing Machines Company, Dayton, Ohio, suffered a fire loss last week due to an explosion in one of its munitions factories. Repairs are already under way, and it is understood that only a small part of the machinery in that department was badly damaged.

The Dayton Co-Operative Iron & Metal Company, Dayton, Ohio, incorporated with $10,000 capital stock by J. Sandmel and others, will not fit up a scrap iron plant as was currently reported.

The Mead Pulp & Paper Company, Dayton, Ohio, has let contract to the Frank Hill Company, Dayton, for an extensive addition to its plant on First Street.

The Western Foundry & Mfg. Company, Springfield, Ohio, has been incorporated with $10,000 capital stock by Clarence O. Luts, John C. Howell and others. No details as to manufacturing plans are now available.

The Lucas Miner Pump Company, Springfield, Ohio, whose incorporation was recently noted, has secured quarters in the Shuey Factories Building and will begin operations at an early date.

The Bartlett Engineering Company, Columbus, Ohio, recently incorporated with $10,000 capital stock by Malcolm Bartlett and others, is fitting up a plant at 172 West Locust Street for the manufacture of machines to make ice cream cones.

It is reported that the Columbus Forge & Iron Company, Columbus, Ohio, has tentative plans under way for an addition to its plant.

The Great Western Sewer Pipe Company, New Lexington, Ohio, has been incorporated with $75,000 capital stock by William Guinsler and others and will soon begin work on a new plant.

Milwaukee

MILWAUKEE, WIS., Aug. 14, 1916.

Machine-tool builders report improvement in domestic inquiry the last fortnight. The slight slackening in demand noted early in July has been overcome. The demand is confined almost entirely to standard types for replacement, and orders specify one or two tools, large lot business being conspicuously absent. Some shops contemplating extensions next fall and winter have put out inquiries for considerable lots. In spite of the machinists' strike, production is fairly well maintained, but the question of prompt delivery is a source of worry, especially in view of the insistent demands of buyers for immediate shipment. Opinion seems to be that the strike may already be declared a failure, and it will not be long before most of the men will be back at their jobs.

Due to the rapid development of the tractor the gasoline and kerosene engine industry is anticipating the busiest season in history, orders already booked taking up a very large percentage of available capacity. Foundries are meeting with difficulty in filling orders, due to the shortage of labor. Structural shops are keeping busy for the most part on a large volume of small orders.

The J. Greenebaum Tanning Company, North Milwaukee, Wis., is taking bids for a two-story addition, 55 x 141 ft., of brick.

Articles of incorporation were filed Aug. 10 in behalf of the Sanitary Refrigerator Machinery Company, Milwaukee. The capital stock is $100,000 and the corporators are Louis Pierron, C. F. Schimmel and A. C. Lingelbach.

The Northwestern Bridge & Iron Company, Milwaukee, has taken the contract for fabricating and erecting the steel work on the new Hugh Agner garage and machine shop at Burlington, Wis. Reinforcing steel will be furnished by the Paul J. Kalman Company, St. Paul, Minn. The architects are Leiser & Holst, Milwaukee.

The W. E. Williams Company, Traverse City, Mich., has completed arrangements for a hardwood flooring and woodworking plant at Oconto, Wis., consisting of a main building, 70 x 240 ft., one story and basement; an engine and filing room, 20 x 80 ft., and boiler and shavings room, 30 x 55 ft. The dry kilns will be in a separate building, 83 x 100 ft., divided into four compartments. The annual capacity will be 9,000,000 ft. of flooring on a 300-day operation with 75 workmen. W. L. DeWitt is local manager.

A report from Calumet, Mich., states that the Mohawk Mining Company has broken ground for a machine shop to supplant its present shop, which has been outgrown. The new shop will be located near the No. 4 shaft. Much new equipment will be required and obsolete machinery replaced.

The Yale Steel Stamping Company, formerly operating a plant at Oostburg, Wis., has filed articles of dissolution.

Articles of incorporation have been filed by the Broadway Garage, DePere, Wis. The capital stock is $10,000 and the corporators are George T. Bridget and Margaret McGeehan. A garage and machine shop will be equipped at once and machinery is now being contracted for.

The Ahnapee Veneer & Seating Company, Algoma, Wis., is ready for bids for several additions to its plant. Plans prepared by De Long & Son, Appleton, Wis., consulting engineers, call for a three-story addition to the main mill, 32 x 75 ft., and a one-story addition, 48 x 80 ft., to the seating shop. M. W. Perry is president.

Herman L. Bergstrom, DePere, Wis., broke ground Aug.

1 for a garage and machine shop, 60 x 120 ft., at Broadway and Charles streets. The shop alone will be 60 x 80 ft.

The Wisconsin Seating Company, New London, Wis., has accepted a contract for manufacturing 30,000 frame and sheet-steel school seating units for the New York Study Chair Company. A new 50-hp. electric motor is being installed and additional equipment will be purchased immediately.

The Turbo Carburetor Company, Milwaukee, has been organized with a capital stock of $10,000 to manufacture gasoline engine devices and specialties. The corporators are Ivan M. Smith, M. L. Fykes and Gladstone Cherry.

The Cedarburg Foundry Company, Cedarburg, Wis., has been purchased from Gustave Zunker and E. J. Groth by Frank Walsh and J. Hyde, West Allis, Wis., and possession has already been taken. The foundry has been operating on a limited scale for several years, but the new owners have sufficient orders to keep it running at capacity for a long time. Beginning Aug. 15, 30 men will be employed.

The Detroiter Garage Company, Platteville, Wis., is breaking ground this week for its new garage and repairshop, to be 40 x 115 ft. in size, part two-story.

The Terrio Mfg. Company, Waupaca, Wis., recently incorporated with a capital stock of $15,000, to manufacture butter testers, egg-candling machines, etc., has elected Nathan Cohen, president; H. P. Mortenson, vice-president; Louis C. Larson, secretary, and Joseph Terrio, treasurer. Leased quarters will be equipped for temporary operations, pending the erection of a factory.

The Jaeschke Brothers Foundry Company, Thirtieth Street and Cawker Place, Milwaukee, awarded contracts Aug. 11 for a brick and steel foundry addition, 40 x 90 ft.

The Modern Garage Company, Milwaukee, has awarded contracts for a garage and repairshop at West Twenty-fourth and State streets, 45 x 125 ft., one and two stories and basement, to cost $10,000 complete.

Several thousand dollars worth of damage was done by fire in the foundry of the Sheriff Mfg. Company, 124 Barclay Street, Milwaukee, Wis.

J. W. Wilkinson has purchased the machine and smithing shop of C. A. Pope at Darlington, Wis., and will install new equipment.

Charles Byse, Red Granite, Wis., has broken ground for a new garage and machine shop, 36 x 110 ft.

On July 30 fire destroyed the plant of the F. C. Miller Planing Mill Company, Newport, Ky., involving an estimated loss of $75,000. Rebuilding plans have not yet been announced.

Detroit

DETROIT, MICH., Aug. 14, 1916.

Machinery trade remains good in spite of the ordinary summer decline. The gradual improvement of the housing conditions in Detroit has made it possible to secure more laborers, with the result that many factories are pushing additions to their plants. Dealers report a good call for tools needed in construction work. In the general market single machines are in the greatest demand, especially grinding and milling machines, which are difficult to obtain for an early delivery. Delivery of all high-grade machines call for from four to six months. All metal-working shops are running to capacity.

Plans for the construction and the machinery lay-out are being made for the proposed plant of the Detroit Seamless Steel Tube Company, Detroit, to cost $2,000,000. Work on the building will not begin for a year. A. A. Templeton is president.

The Wallace Motor Mfg. Company has been incorporated with a capital of $25,000. Francis J. Wallace, 600 Michigan Avenue, Detroit, is head of the corporation.

The Auto Light Control Company, care of Marshall D. Elgin, 224 Charles Avenue, Detroit, has incorporated for $25,000, taking over the business of the Grand Rapids Dimmer Company. It expects to manufacture and sell auto light controls and specialties.

The Imperial Welding Company, Detroit, has organized with a capital of $15,000. George Christopulus, 150 Lafayette Avenue, Detroit, is president.

The new machine shops being constructed for the Oakland Motor Company, Pontiac, will call for the employment of 600 additional men. W. C. Durant, 600 West Fifty-seventh Street, New York, is president of the General Motors Company, of which the Oakland Company is a subsidiary.

The Holland Ladder Company, Holland, Mich., are planning to erect another building. Thomas H. Tasker is president.

The Republic Motor Truck Company, Alma, has quadrupled its capital to $1,000,000 and plans to triple its output.

The Pentwater Machinery Company, Pentwater, Mich., has been organized to conduct a general machine shop and manufacturing business. The capital stock is $25,000.

The L. O. Gordon Mfg. Company, Muskegon, Mich., has practically completed its plant for the manufacture of cam shaftings and other motor specialties. The company was organized by L. O. Gordon and two Cleveland men. It is planned to start deliveries next month.

A $250,000 company is being formed in Detroit to manufacture the Stearns ware-proof tube. A. F. Howard, 728 Penobscot Building, Detroit, is in charge.

The Detroit Truck Company has been incorporated with a capitalization of $50,000. James M. Hibbard, president of the Accessory Forgings Company, 1440 Orleans Street, Detroit; Fred L. Paterson and Robert M. Brownson are the organizers.

The Detroit Battery Company, manufacturer of storage batteries, Detroit, is moving into a new three-story building at 104 High Street West, constructed to meet its growing needs. Sidney W. Elliston is president.

The Continental Motor Mfg. Company, 2935 Jefferson Avenue East, Detroit, is planning an addition to its automatic screw machine department at Muskegon, which will increase the floor space devoted to that department 30,000 ft. Extensive enlargements are also being made at the Detroit plant. B. F. Tobin is president.

Hallgarten & Co. and Eugene Myer, Jr., & Co. have contracted to purchase the $5,000,000 preferred stock and part of the 200,000 common shares of the Fisher Body Corporation, a consolidation of the Fisher Body Company and the Fisher Closed Body Company, both of Detroit, Mich., and the Fisher Body Company of Canada, Ltd., Walkerville, Ont.

The Enterprise Brass Works, manufacturer of plumbers' brass goods, brass, bronze and aluminum castings, Muskegon, Mich., has started a three-story brick and steel addition, 50 x 150 ft., making a total addition of 22,500 sq. ft. of floor space to be devoted to the casting and machining of plumbing fixtures. Hitherto the company has been limited, by lack of room, to the making of the castings, but hereafter the finished product will be turned out here. F. W. Burgstahler & Sons, builders, Grand Rapids, are constructing the building.

The Flint Cushion Spring Company will commence work at once on the first unit of its factory system to be erected at Flint, Mich.

The Central South

LOUISVILLE, KY., Aug. 14, 1916.

An all-round activity characterizes the local trade without the rush that was everywhere in evidence a few weeks ago, but with the demand still insistent. Power equipment, both electrical and steam, continues to be widely wanted, but it is said that deliveries are being promised for earlier dates.

The Globe Tanning Company, Ninth and Dumesnil streets, Louisville, is building and will equip a boilerhouse.

Improvements and additions to the municipal power plant at Owensboro, Ky., to cost $20,000 to $25,000 are to be made. Superintendent Breidenbach of the power plant may be addressed.

The Owensboro Forging Company, Owensboro, Ky., is installing 16 gas forges and 10 japanning ovens and will operate on gas when completed. Ridley Ewing, general manager, is considering changing the plant over to electric drive.

The tipple and equipment of the Central Coal & Iron Company, Central City, Ky., were destroyed by fire at an estimated loss of $25,000. Shelby Gish, manager, plans to rebuild immediately.

The Levanna boat yards and marine ways of the Barret Mill & Lumber Company, Dover, Ky., idle for four months, is being renovated and will resume operations.

The Elkin Power Hemp Brake Company has been organized at Lexington, Ky., and will arrange for the manufacture of its product. Warren Elkin is a stockholder.

Contract for construction of the $60,000 tobacco prizing and rehandling plant of the Kentucky Leaf & Transit Company, Hopkinsville, Ky., has been let to the Forbes Mfg. Company of that city. Hydraulic presses and special machinery will be installed.

The Kentucky Prison Commission will at once begin preparations for rebuilding the prison chair factory at Frankfort, destroyed by a recent fire. A building, 50 x 130 ft., will be erected.

Oil-development companies being organized in Kentucky and in the market for drilling and power equipment include: The Chenault Oil & Gas Company, Fort Estill, $25,000 capital, incorporated by Harvey and Walter Chenault; the Cow-

Creek Oil Company, Salt Lick, capital $100,000, T. B. Staggs, A. W. Sanderson, and others, incorporators; the Puckett Oil Company, Irvine, $32,000 capital, B. H. Henderson, B. J. Shaw, and others, incorporators.

The Algonquin Oil Company, Barbourville, Ky., C. P. Kennedy, president, has increased its capital from $1,000 to $2,000 and is in the market for a 25-hp. steam traction engine, new or second-hand.

A second-hand 400 cubic foot steam-driven air compressor and a well-drill, 1000 to 1200 ft. capacity, walking beam steam tractor, second-hand, are wanted by the American Metallic Packing Company, Lexington, Ky.

Fire destroyed the garage and contents of Rister & Sons at New Harmony, Ind., at a loss of $10,000.

McNutt & Co. have established an electrical automobile supply house at 813 South Gay Street, Knoxville, and will conduct a general repair shop.

An addition, to give 30,000 more sq. ft. of floor space, will be built to the Southern Coffin & Casket Company, Knoxville, Tenn., C. G. Childress president.

A. R. Pryor, Jasper, Tenn., will establish a garage and machine shop for automobile repair work and other machine shop operations.

The barytes mill of John T. Williams & Son, Bristol, Tenn., built and equipped at a cost of more than $250,000, and idle for several years, is being overhauled and the machinery repaired preparatory to resuming operations.

The John G. Duncan Company, 308 West Jackson Avenue, Knoxville, Tenn., is asking for prices for immediate delivery on a second-hand, internally-fired return-tubular boiler, or marine type boiler, of 100 to 150 hp., for 100-lb. pressure.

The Dixie Foundry Company, manufacturer of gray-iron castings, Cleveland, Tenn., plans to put its foundry in operation not later than Oct. 1. J. C. McKenzie is manager.

St. Louis

ST. LOUIS, MO., Aug. 14, 1916.

Transactions in machine tools continue fairly satisfactory, though there has been some let up in the demand. The business moving is of sufficient volume to have been called very large in the days before the European War began. The call is from all sources. Single-tool demand prevails. Second-hand tools are very scarce and are in somewhat better demand. Collections are very good and investment as well as commercial funds available at good rates.

Contracts have been let by the Anheuser-Busch Brewing Association, St. Louis, Mo., for the construction of a plant to cost in all $2,500,000. It will be equipped for the manufacture of a new non-intoxicating beverage. The building will occupy an entire city block, and will be seven stories high, 250 x 580 ft. Trains will enter the basement, by underground tunnels, for transportation purposes.

The Laundry Dryer & Heater Company, St. Louis, Mo., has been incorporated with a capital stock of $15,000 by A. P. Mathey, A. P. Schaefer and A. M. Graham to manufacture heating machinery.

The M. A. Morris Mfg. Company, St. Louis, Mo., has been incorporated with a capital stock of $12,000 by M. A. Heimann, Hellmuth M. Kinner and Henry Zeiss to manufacture store equipment.

The Scudder Motor Truck Company, St. Louis, Mo., has been incorporated with a capital stock of $10,000 by Charles M. Polk, Clifton R. Scudder and Leclare M. Amrine to equip a machine shop and garage.

The East St. Louis Water Company, the Belleville Water Supply Company and the Granite City Water Supply Company, in Illinois, have been consolidated with a capital stock of $5,000,000 and some plant revision is contemplated to effect more economical operation.

The A. B. D. Company, Kansas City, Mo., has been incorporated with a capital stock of $50,000 by A. W. Aylor, K. L. Day and M. E. Groom to equip a machine shop and garage.

The Valley Mfg. Company, Ironton, Mo., has been incorporated with a capital stock of $12,500 by H. N. Brown, Jacob W. Time and Oka M. Brown to manufacture handles and other wood products.

The Midland Milling Company, North Kansas City, Mo., organized by Fred O. and George C. Shane of Philadelphia, Pa.; George Innes, Saskatchewan, Can., and J. A. Innes, Eagle Grove, Can., will equip a flour mill of 1500 bbl. daily capacity. Power will be derived from Diesel engines. J. A. Innes will be manager.

The Moberly Artificial Ice Company, Moberly, Mo., plans to equip a cold storage plant of 1000 tons capacity and will also install a 25-ton ice-making unit.

H. Sour, Joplin, Mo., will equip a concentrating mill of 100 tons capacity per shift.

The Mid-West Iron Company, Commerce Building, Kansas City, Mo., is in the market for single-truck and double-truck locomotive cranes, one 200-kw. belted generator, one 20 to 30-ton locomotive of 2-ft. gage, and other allied equipment.

J. F. Gardner & Co., Jelks, Ark., will equip a three-stand, 70-saw gin outfit requiring about $5,000 of machinery.

The Hanson Lumber Company, Lewisville, Ark., will equip a three-stand cotton gin requiring about $4,500 of machinery.

The People's Gin & Ice Company, Marvell, Ark., has been incorporated with a capital stock of $10,000 by F. R. Garner, Sr., and F. R. Garner, Jr., and others and will equip a cotton gin and an ice-making plant.

The McNeely Motor Company, Arkansas City, Ark., will purchase at once machine shop and garage equipment, including electric motor, lathe, drill press, etc. T. B. McNeely is president and manager.

C. C. Epps, Bristow, Okla., will equip a cotton gin plant including a 6-stand, 80-saw outfit, two cold presses for oil pressing, etc.

The Crescent Refining Company, Tulsa, Okla., has been incorporated with a capital stock of $200,000 by J. R. Utterback, M. E. Utterback and W. A. Doty and will equip an oil refinery.

The Altus Ice & Fuel Company, Altus, Okla., will install equipment to increase its ice-making capacity from 60 to 100 tons daily. W. H. Echols is manager.

The Gas Burner Mfg. Company, Tulsa, Okla., has been incorporated with a capital stock of $10,000 by M. J. and T. J. Flanagan and others to manufacture gas burners and other devices.

Tulsa, Okla., has voted $180,000 for a filtration plant and to improve its water works pumping plant. H. H. Wyss is city engineer.

J. C. Penn will equip a welding plant at Laurel, Miss., and is in the market for machinery.

The Bay Creek Lumber Company, Purvis, Miss., will install additional power and kiln equipment, steam log turner and system of rolls.

St. Martinsville, La., will receive bids until Aug. 22 on one 100-hp. crude-oil engine, one 80-kw. generator, one 250-gal.-per-min. and one 500-gal.-per-min. electric pumps, transformers, etc. Albert Bienvenu is mayor.

Westwego, La., will install waterworks equipment to cost about $17,500. V. A. Pitre is in charge. A 60-hp. engine and 500-gal.-per-min. underwriters' pump are included.

The Humason Superheater Company, Shreveport, La., has been incorporated with a capital stock of $100,000 by George F. Gallagher, H. R. Ratcliff and Gilbert W. Williams to manufacture a superheater for motor cars.

The Louisiana Alabama Sulphur & Oil Company, J. E. Brady, president, Biloxi, Miss., will install about $25,000 equipment on its property in Calcasieu Parish, La.

The Developers Oil & Refining Company, Shreveport, La., has been organized with capital of $1,000,000 and will equip an oil refinery of 1000 bbl. per day capacity. R. M. Hyams, New Orleans, La., is president. A pipe line and oil pumping stations will be equipped also.

Birmingham

BIRMINGHAM, ALA., Aug. 14, 1916.

While the volume of machinery business has not reassumed normal proportions, inquiry is increasing and indicates gradual recovery. Ginning and cotton-mill machinery is being shipped in large quantities. Machine tools are in brisk demand and deliveries have improved. Gasoline engines are active. Appliances for structural work are dull in the extreme. The agricultural section shows signs of recovery from the setback created by flood losses.

The Commercial Hardwood Company, Demopolis, Ala., capital $50,000, has been incorporated by Clarence Kirvin, H. L. Wood and others, to establish band mill and manufacture hardwood lumber.

The Jefferson Mfg. Company, Savannah, Ga., has been incorporated by Harry J. Kuhr, Savannah, and Crester V. Joseph, Indianapolis, with a capital stock of $25,000, to manufacture iron and steel bridges, culverts, etc.

The Great Southern Lumber Company, Bogalusa, La., W. H. Sullivan, general manager, will establish a new mill at a cost of $1,000,000, supplementing a plant already said to be one of the largest in the world.

The Andrew Ramsay Company, Mount Savage, N. C., capital stock $150,000, has been incorporated by Andrew Ramsay, J. James Gardner and others to manufacture clay products.

The B. Mifflin-Hood Pottery Clay Products Company, Daisy, Tenn., organized by B. Mifflin-Hood, Atlanta, Ga., C. L. Krager and others, will build a plant to manufacture shale acid tower rings and blocks, roofing tile, etc.

Russe & Burgess, Memphis, Tenn., have purchased 7000 acres of timber land on Honey Island in Holmes County, Miss., and will build a band sawmill to cut oak and gum timber.

Texas

AUSTIN, TEX., Aug. 11, 1916.

Revival of oil development operations in the different Texas fields is causing an increasing demand for well-boring outfits and other equipment. The machinery and tool trade is holding up remarkably well through the heated term.

Mrs. C. W. Post, Battle Creek, Mich., will build both meat-packing and ice-making plants at Post at a cost of about $100,000.

The Oatman Water & Sewer Company, Oatman, Ariz., plans to pipe water from the Colorado River, a distance of 11 miles, and to pump it into a large storage reservoir which it will build for the purpose of supplying the town and adjacent mines with water. The same company will construct an electric light and sewer system. More than $500,000 will be expended in these public utility projects. V. S. Rowley is president.

The American Smelting & Refining Company will install pumps at its Morgan mine, near Tucson, Ariz.

The El Paso & Southwestern Railway has purchased the cement and brick-manufacturing plant at Ancho, N. M., and will install additional machinery to increase its capacity.

The Pacific Coast

PORTLAND, ORE., Aug. 8, 1916.

Waterfront activities are now proceeding in about the normal manner, and coastwise lumber trade has been actively resumed, with a strong demand. The movement of machine tools is about all that could be expected under present conditions, many of the smaller shops and garages through the country being anxious to buy, but reluctant to pay current prices for new tools. Deliveries show little improvement, and the number of firms in a position to order for distant delivery is limited. Few tools, either new or second-hand, are offered for prompt shipment. Buying of miscellaneous equipment on the part of mines and smelters shows little abatement, though large single orders are perhaps less numerous. Electric and water-power machinery is in fairly active demand, and some substantial inquiries are appearing for irrigation work. Grain crops are moving slowly, but with high prices the agricultural districts are in good shape, and the demand for implements and farm machinery is good. Foreign demand for machinery is active, but shipments are limited by lack of space.

Statistics prepared by the Pacific Lumber Inspection Bureau, Seattle, show that North Pacific tidewater mills shipped 689,491,666 ft. of lumber the first six months of 1916 as compared with 690,820,074 ft. the first six months of 1915, and 902,952,315 ft. the first six months of 1914. Exports amounted to 1,515,699,355 ft. for the first half of the current year. The Australian market, which ordinarily takes the largest amount of lumber cut for export in the North Pacific district, shows a loss of 82.50 per cent as compared with 1914 and a gain of 9.01 per cent over the first half of 1915.

The owners of Fanning Island, in the South Pacific Ocean, are planning to establish a coaling station.

It is reported that the Corliss Gas Engine Company's plant at Petaluma, Cal., has been acquired by the Standard Gas Engine Company and will be consolidated with its plant at Oakland, Cal. This plant is being equipped for the manufacture of Southwark-Harris Diesel engines.

J. H. Hansen, of J. H. Hansen & Co., San Francisco, agents for Skandia Diesel engines, has just returned from New York and announces plans to manufacture the engines for Pacific territory in the vicinity of San Francisco.

A building contract has been let for a cement plant at Darrington, Wash., of 2200 bbl. per day capacity. C. H. Bacon, Seattle, is in charge, and H. Bittman, Securities Building, Seattle, is construction engineer.

The Colfax Iron Works, Colfax, Wash., has replaced most of the patterns destroyed in its recent fire, and is working on numerous orders for grain mills for points from Oregon to Montana.

The Albina Engine & Machine Company, Portland, has taken a contract for repairs to the steamer Kenkon Maru amounting to about $235,000.

The Port Commission, Astoria, Ore., is taking figures on a locomotive crane for the port docks.

The Warrenton Clay Company, Warrenton, Ore., has begun construction work on its tile and clay manufacturing plant, to be completed by Nov. 1 at a cost of $75,000.

Work has already begun on driving piles and laying foundations for the shipbuilding plant to be constructed at Youngs Bay on the Columbia River by the American Shipbuilding Company, Spokane, Wash., headed by H. B. Spear. It is estimated that preliminary work will be completed within 30 days. About five wooden schooners for transporting lumber are planned to be completed this year.

The properties of the Butte & Bacorn Copper Mining Company, Butte, Mont., have been sold to the Great Butte Copper Mining Company, owned by capitalists of Pittsburgh and New York, and capitalized at $1,000,000. The mine will immediately be equipped with a steam hoist, to be replaced later with electrical equipment, and it is stated that $185,000 will be expended in development work. F. W. Bacorn, Butte, is president; Charles Hyde, Pittsburgh, is treasurer.

The Richards Brush Company, Seattle, Wash., plans the construction of a factory on Dearborn Street, 50 x 90 ft., of reinforced concrete.

Frank B. Mitchell, Baker, Ore., has recently purchased timber holdings and plans the establishment of a planing and saw mill in Baker, a saw mill in Austin with a capacity of 50,000 to 75,000 ft. a day, etc. It is stated the work now planned will cost $100,000.

The Great Western Sugar Company has recently secured 150 acres near Missoula, Mont., where a sugar plant will be erected to cost about $1,000,000. W. L. Lawson is Montana manager.

City Purchasing Agent Wood, Portland, Ore., will receive bids until Sept. 1 for one multi-stage turbine pump, direct connected to a 200-hp. motor.

The Ashland Mining Company, Ashland, Ore., plans the installation of electric power throughout its plant.

It is announced in Portland, Ore., that Swift & Co. interests of Chicago contemplate the construction of a shipbuilding plant in Portland. It is reported the company has secured contracts for three vessels to be built immediately.

The Trail Lumber Company, Medford, Ore., has recently completed plans for the installation of new machinery at its plant, and an up-to-date lumber mill and box factory will be operated. G. T. Gagnon is manager.

Canada

TORONTO, Aug. 14, 1916.

War expenditure in Canada is now $1,000,000 per day. The budgets of 1915 and 1916 are both working out satisfactorily, so that it is possible that a portion of war expenditure will be paid out of the government revenue. The balance of war expenditure of the year will be defrayed partly out of the domestic war loan issued in November last and from future war borrowings.

The Montreal Locomotive Company, subsidiary of the American Locomotive Company, has been doing an increasingly large shell business in its Montreal plant. Although not a great deal has been said about this company's output of munitions it is reported to be one of the largest producers of shells on the continent. A shipment of machinery from the United States company to the Canadian plant recently was construed to mean that the company was contemplating an extension. The management, however, asserted that such shipments are part of a development which has been in progress for some time.

The Imperial Oil Company, Montreal, has secured 400 acres at Dartmouth, Nova Scotia, and has commenced the erection of a refining plant to cost $2,000,000, to cover a site of 40 or 50 acres. The plant will consist of storage tanks, refinery, machine shops, warehouses, etc. S. S. Shatford is manager.

Beatty Brothers, Fergus, Ont., manufacturers of car-wheels, etc., propose to erect a plant at a cost of $50,000.

Fire destroyed the machine shop and brick plant of the Dominion Stove & Foundry Company at Penetanguishene, Ont.

H. G. James, Sherbrooke, Que., proposes to build an addition to his machine shop at a cost of $7,000.

Bids will be called by A. F. Macallum, city commissioner, Ottawa, for the construction of a civic workshop estimated to cost $14,000.

The contract for extensions to the roundhouse of the Canadian Northern Railway at Port Arthur, Ont., has been let to J. Brown, Winnepeg, Man., at a cost of $47,000.

The Collingwood Packing Company's plant at Colling-

wood, Ont., which was erected some years ago at a cost of $1,000,000 was damaged by fire Aug. 6, with a loss of $100,000.

The Stinson-Reed Builders' Supply Company, Ltd., 903 Read Building, Montreal, is in the market for a 75-hp. 550 volts, 60 cycle motor.

Hamilton, Ont., is contemplating the spending of $100,000 on a new steam turbine for the waterworks and other improvements to the plant. City waterworks engineer Milne of Toronto will submit a report in a few days.

Six new pumps will be purchased for the Horton Street pumping station by the Public Utilities Commission of London, Ont. E. V. Buchanan is manager.

Bids for the erection of an addition to the machine shop of the Canadian Ingersoll-Rand Company, Commissioners Street, Sherbrooke, Que., are being received by H. W. Haight, the company's engineer. The addition will cost $70,000. H. G. James, Whiting Block, is the architect.

T. J. Davidson has received the contract for the erection of a large addition to the premises of the Canadian Briscoe Motor Car Company, Brockville, Ont.

J. D. Young & Son, 835 College Street, Toronto, has received general contract for three buildings for the Chevrolet Motor Company of Canada, at Oshawa, Ont.

The Adams Brothers Harness Mfg. Company, Ltd., 204 King Street East, Toronto, is having a site cleared at 781 King Street West, for a reinforced concrete factory to cost $75,000.

The Russell Motor Car Company, King and Duncan streets, Toronto, will build an addition to its foundry to cost $3,000.

The Canadian Steel Foundry, Welland, Ont., will erect a forge shop at a cost of $6,000, and has awarded the contract to Ryan & Gardner, Main Street East.

The Electric Steel & Metals, Ltd., Welland, Ont., will erect an addition to its foundry to cost $10,000.

Fire totally destroyed the transformer station at Dundas, Ont., owned by the Provincial Hydro Electric Power Commission, of which F. A. Gaby, University Avenue, Toronto, is chief engineer. The loss to the building will amount to $25,000 and to the machinery $100,000.

The building at 126 Garden Avenue, Toronto, occupied by the Fordel Callender Company, the Dame Metal Company and the Reliance Weather Stripping Company was damaged by fire with a loss of $9,000.

The Milton Foundry, Ltd., Milton, Ont., has been incorporated with a capital stock of $40,000 by Alexander Faskin, Excelsior Life Building, Francis H. Hurley, 32 Aberdeen Avenue; Duncan McArthur, and others, all of Toronto, to manufacture machinery, implements, etc.

The Standard Ideal plant at Port Hope, Ont., has been sold to L. M. Wood, president of the Standard Chemical Company, and associates, among whom are W. D. Ross. The new company will take possession at once, and in addition to carrying on the present line of business, propose to manufacture shells.

The City Council, London, Ont., proposes to install waterworks equipment, including a waterwheel, electric generator and a 250-hp. pump, estimated to cost $15,000. E. V. Buchanan is manager.

The Essex Border Utilities Commission, Windsor, Ont., will construct a sewer and waterworks system at a cost of $2,000,000. E. Brien, city engineer, is chairman; Leonard Rice, Ojibway, Ont., is secretary.

The Dominion Steel Products Company, Brantford, Ont., proposes to build a plant at a cost of $50,000. W. P. Kellett, 266 Park Avenue, is president.

The Canadian Pacific Railway, Montreal, Que., will receive bids shortly for the construction of a powerhouse, coaling plant, blacksmith shops and a storage building of steel and concrete at McAdam, N. B.

Additional machinery will be installed by the Toronto Paper Mfg. Company, Cornwall, Ont., which will bring the capacity of the plant up to 30 tons per day. R. S. Waldie is president and W. Wallace is manager.

The Joliette Steel Company, 903 Read Building, Montreal, is in the market for a new or second-hand three to five-ton suspension scale for weighing steel castings.

The recent fire at the plant of the O'Brien Munitions, Ltd., Renfrew, Ont., was the second, not the third, at the plant since it has been in operation, and the loss is confined to three buildings valued much under $100,000, recently stated to be the loss. J. L. Murray is managing director.

The Snyder Desk & Table Company, Ltd., Waterloo, Ont., has been incorporated with a capital stock of $75,000 by Herbert M. Snyder, Alfred H. Snyder, Clayton H. Snyder and others to manufacture desks, tables, furniture, etc.

Government Purchases

WASHINGTON, D. C., Aug. 14, 1916.

The purchasing officer of the Panama Canal, Washington, will open bids Sept. 1 for furnishing under circular 1072, class 11, one electrically controlled refrigerating plant: class 14, one sliding head drill press.

The lighthouse inspector, Boston, Mass., will receive sealed proposals until 2 p. m., Aug. 22, for furnishing two air compressing outfits.

The chief of ordnance, War Department, Washington, will receive bids until noon, Aug. 29 for furnishing 960 6-in. shells, model 1911; 1750 12-in. shells, model 1912; 200 14-in. shells, model 1915, and 14,500 12-in. shells of 700 lb., model 1911.

The commanding officer of the Frankford Arsenal, Philadelphia, will receive proposals until Aug. 30, under proposal No. 38, for furnishing 30,000,000 gallery practice cartridges, 22 caliber.

The chief of the Bureau of Ordnance, Navy Department, Washington, will receive proposals until 12 noon, Aug. 23, for the following projectiles: 9000 14-in. armor-piercing; 2800 14-in. class B; 31,500 6-in. common; 185,600 5-in. common; 139,529 4-in. common; 300,000 3-in. common; 87,500 one-pounder anti-aircraft and 187,500 one-pounder common.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, Aug. 8, for supplies for the naval service as follows:

Schedule 9894, Construction and Repair.

Class 62, Brooklyn—Two motor-driven buffing lathes—Bid 87, $730; 99, $644, $553.70 and $496.80; 125, $454 and $675.

Schedule 9902, Ordnance.

Class 93, Washington—One boring, milling and drilling machine—Bid 126, $13,750.

Schedule 9903, Construction and Repair.

Class 101, F.o.b. works—Six air compressors—Postponed to Aug. 15.

Schedule 9904, Construction and Repair.

Class 102, Philadelphia—One power brake—Bid 13, $5,273, $5,799, $6,225, $6,765, $8,431 and $9,897; 89, $11,655; 99, $7,125; 125, $7,000; 130, $5,195; 166, $7,013.30; 183, $7,081.

Schedule 9905, Steam Engineering.

Class 111, Brooklyn—One motor-driven tool room lathe—Bid 99, $1,930; 125, $1,870; 183, $1,799.75.

The names of the bidders and the numbers under which they are designated in the above list, are as follows:

Bid 13, Bertsch & Co.; 87, Kemp Machinery Company; 29, Loy & Nawrath Company; 99, Manning, Maxwell & Moore, Inc.; 125, D. Nast Machinery Company; 126, Niles-Bement-Pond Company; 130, George A. Ohl & Co., Inc.; 166, Sherritt & Stoer Company, Inc.; 183, Vandyck-Churchill Company.

No Compensation for Injuries in "Horse Play"

Employees injured while engaged in "horse play" during hours of employment cannot be considered as coming under the workmen's compensation act in Pennsylvania, according to a decision just handed down by the Compensation Board, in the case of the Pressed Steel Car Company and Franciska Tomosoka, an employee. The decision sustains the referee in the Pittsburgh district, who refused to award damages to Tomosoka's heirs. He and a fellow employee were cooling themselves with a compressed air hose and Tomosoka's death ensued.

The decision says that the board regards the case as one concerning injuries "from sportive acts of fellow workmen in which the injured himself indulged," and "it seems to us that it would be at variance with common sense to find that, where the deceased invited his companion to do what he did, he was in course of his employment."

Losses paid by workmen's compensation insurance companies in Wisconsin in the year ended June 30 amounted to more than one-half of the premiums received, according to the annual report issued by the insurance commissioner of Wisconsin. The loss ratio of the entire country is 46.1 per cent. In Wisconsin the total amount paid as premiums for the period was $2,273,298, and losses paid were $1,224,616, a loss ratio of 52.9 per cent. Steam boiler premiums for the period were $84,439, and losses were $6,315. Flywheel premiums were $6,174 and losses $2,736.

NEW TRADE PUBLICATIONS

Lathes.—Lodge & Shipley Machine Tool Company, Cincinnati. Collection of bulletins. Illustrations and descriptive matter explain the operation of the company's lathes and the various uses to which they may be put. The bulletins are arranged so that the several parts of the lathes are illustrated and described first, followed by bulletins dealing with the completed tool. The lathes listed include engine lathes with cone pulley and selective head arrangements for securing different spindle speeds, a portable lathe and one for heavy forgings. A bulletin giving examples of the work that has been done on the various machines is included.

Steam Heating.—Warren Webster & Co., Camden, N. J. Catalog. Size, 8 x 10 in.; pages, 144. Illustrates and describes the Webster vacuum system of steam heating and the apparatus employed in connection therewith. The application of vacuum in steam heating and the advantages of the system are discussed, followed by a chapter on its design and installation. A typical system is next described, followed by illustrations and descriptions of the various appliances used. Mention is made of the other apparatus manufactured, such as feed water heaters, steam separators and traps, air conditioning apparatus, etc. Views of the buildings in which the company's heating system has been installed are included.

Motor Trucks.—Packard Motor Car Company, Detroit. Motor truck bulletin No. 27. Points out the advantages of using a motor truck for transporting brick and clay products of all kinds as compared with a horse and wagon. In the case cited the truck earned nearly $4,000 from April, 1911, to Dec. 31, 1915, and completely paid for itself in 5 years.

Induction Motors and Air Compressors.—Allis-Chalmers Mfg. Company, Milwaukee. Four bulletins. The first, No. 1087A, mentions a line of polyphase induction motors which are built in a great variety of sizes. The design and construction of the motors are gone into at some length, being supplemented by engravings of the various parts. A number of views of installations of the motors are included, as well as engravings of the motors themselves. Bulletins No. 1525A and No. 1530A, supplementing No. 1525 and No. 1530, describe two types of compressors for airbrake or stationary and portable work. The last bulletin, No. 1536, superseding No. 1523, presents data on industrial applications of stationary and portable air compressor equipment.

Balancing Washer.—Munning-Loeb Company, Matawan, N. J. Booklet. Describes a balancing washer which serves both as a safety device and timesaver in the balancing of buffing and polishing wheels, being designed as a substitute for the method of balancing by attaching pieces of lead, nails and screws to the light side of the wheel. A view of the washer in use is given, and directions for balancing a wheel with it are presented. Mention is made of the other products of the company which include a complete line of platers' and polishers' machinery, apparatus, chemicals and supplies.

Vacuum Drying Apparatus.—J. P. Devine Company, Buffalo. Three bulletins. The first, No. 101, covers a line of vacuum chamber units adapted for drying materials that can be handled on trays or pans. The second, No. 102, refers to the drum type machine for drying liquid solutions containing solids to a powder and the third, No. 103, gives general description and specifications for rotary dryers for use in connection with materials that can be mixed or tumbled in the drying process. Details of the construction of the various types and tables of the several sizes of each that can be supplied are included.

Electric Hoists.—Euclid Crane & Hoist Company, Euclid, Ohio. Catalog No. 18. Devoted to a line of electric hoists and monorail trolleys. After a short introduction pointing out the advantages of using electric hoists and trolleys in industrial plants of various kinds, a brief general description of the construction of the hoists is given. This is followed by illustrations and condensed descriptions of the various standard types of hoists and the controllers and brakes used. A number of engravings of installations of the hoist are included.

Machine Tool Controllers.—Cutler-Hammer Mfg. Company, Milwaukee. Folder. Describes a line of controllers for machine tools that are made in three different types, plain starting, speed setting and speed regulating, designed for use with machines where the necessary speeds are obtained by gears, where the motor is automatically started and the field rheostat is employed to provide the various running speeds and where it is desired to give the operator control of the starting, stopping, speed regulating and reversing from one point respectively. Brief descriptions of the three different types are given and emphasis is laid upon the fact that the company's magnetic lockout switches are used in all, thus eliminating all interlocking contacts and circuits, series relays, protective resistances, etc. A number of illustrations of applications of the controllers to machine tools are included.

Hose Couplings and Throttle Valves.—Dixon Valve & Coupling Company, 19 North Seventh Street, Philadelphia. Folder. Pertains to a line of hose couplings for steam, air drill and other severe high pressure services. Illustrations of the coupling complete and also disassembled are given, together with a list of the sizes that can be supplied. Mention is made of a throttle valve of extra heavy construction for rough service.

Reinforced Concrete Industrial Buildings.—Turner Construction Company, 11 Broadway New York. Bulletin No. 18. Calls attention to the record that has been made by the company in the past 14 years in executing 573 contracts for 125 different industries within the time limit specified in the contracts. A number of views of various contracts are given, showing some of the different buildings completed, and in a number of cases progress pictures of an operation are presented.

Overhead Carrying Devices.—New Jersey Foundry & Machine Company, 90 West Street, New York City. Catalog No. 88. Covers a line of overhead carrying devices which includes tracking, trolleys, hoists, cranes, buckets, cars, etc. Illustrations and brief descriptions are presented together with tables giving the sizes of each that can be supplied. A number of engravings of actual installations are included.

Air Compressors.—Chicago Pneumatic Tool Company, Fisher Building, Chicago. Bulletin No. 34-N. Deals with single inclosed self-oiling steam and belt driven air compressors. After a longitudinal section showing the details of construction and engravings and specification tables of the various types of compressors, the construction is gone into at some length, the text being supplemented by numerous engravings of the different parts. Illustrations are presented of a motor-driven air compressor mounted on a steel truck for portable use and one that is mounted, together with the receiver, on a mine car. A table of the various sizes of air receivers that can be supplied is included.

Cutters.—National Tool Company, Cleveland. Catalog C. Gives illustrations, brief descriptions and size tables of various kinds of high-speed and carbon steel milling cutters. The cutters shown include the plain, side, face and angular types, in some cases with nicked and inserted teeth. End mills and cutters for keyways, T-slots, taps, reamers, twist drills, chains and sprockets and gear wheels are also shown. Formulas for determining the dimensions of gears by the metric pitch are given, together with tables showing the tooth depth and thickness in spur gears and the corresponding diametrical and circular pitches. Mention is made of stocking cutters for involute gears, hollow or lathe mills and counterbores and a comprehensive index is included.

Wing Nuts.—National Screw & Tack Company, Cleveland. Folder. Relates to a line of forged steel wing nuts which are made in a number of different shapes and in tap sizes ranging from 5/32 to ⅜ in. Illustrations of the regular designs of nuts are given together with two of the more special shapes. Mention is made of the other products of the company, which include screws, bolts, rivets, cotters, keys and nuts.

Portable Electric Tools.—United States Electrical Tool Company, Cincinnati. Catalog No. 15. Shows a great variety of portable electric tools, including hand and breast drilling machines for wood and metal, combination hand and bench drilling machines, two types of radial drilling machines, an electric screw driver and grinding machines of the center, external, internal, surface, portable, bench and floor types. In connection with the various machines brief descriptions and tables of the sizes that can be supplied are included. A number of views of installations are given and mention is made of a line of motor-driven tire pumps and special machines for grinding the knives of woodworking machinery without removing them. Instructions on the care of electrical tools are given and a telegraph code is included. An illustrated description of the electric screw driving machine appeared in THE IRON AGE, May 13, 1915.

Gas-Engine-Driven Pumps and Hoists.—Domestic Engine & Pump Company, Shippensburg, Pa. Bulletin No. 16C. Size, 6 x 9 in.; pages, 28. Treats of a line of gas-engine-driven diaphragm, centrifugal, combination and force pumps, geared and chain driven hoists and special outfits for applying power to hand derricks. Illustrations, brief descriptions and condensed specification tables of the various hoists and pumps are included.